Education in Human Values: An Analysis of Science Textbooks

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Preface

The textbooks occupy a very significant position in our education system and serve as the major reading material in the hands of students especially at the school stage. Most of the time, teachers also depend only on textual material. The textbooks apart from providing knowledge also help in developing positive attitudes and values. They are the chief vehicle for attaining the goals of curriculum. The textbooks of all the subjects have the potentiality to inculcate certain human values among students. The science textbooks are not exception to it. It is generally believed that a science textbook is a compendium of scientific conclusions which are supposed to be accepted by the students, but on going through the science textbooks it was found that they develop scientific temper and attitude to live meaningfully in a science and technology based society. The values related to science have been mentioned in the National Policy on Education: (1986) and National Curriculum for Elementary and Secondary Education : A Framework (1988) and are also found in science literature. It is expected that the science textbooks would reflect those values. The present study has made an attempt to analyse the science textbooks prepared by NCERT for upper primary stage to ascertain the extent to which various values have been represented in these textbooks.

Although many studies on science textbooks and articles on values of science and teaching science with focus on values have appeared in the literature, but research on value emphasis in science textbooks somehow failed to draw researchers' interest. The textbooks are revised periodically in order to update knowledge and address human, national and social concerns. Analysis of textbooks for their representation of various aspects including content, objectives, principles, pedagogical approach, attitudes and values and current social concerns etc is very much required to provide a research base for revision and improvement of textbooks. The present study reveals the position with respect to values reflected in science textbooks and may prove to be helpful for bringing about improvement in value emphasis in the science textbooks. The framework developed for analysis of the science textbooks and the chapter-wise analysis of the contents of the textbooks have been given in the Appendices I and II respectively.

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Chapter- I

Introduction

Values are an integral part of an individual. They not only guide human behaviour and conduct but also provide meaning to life. The need and importance of education in human values have always been felt and emphasized by individual thinkers from various disciplines, great scholars and eminent educationists. Various commissions and committees on education set up from time to time in India since independence to reform education system have recommended inculcation of values in different words like religious, moral, social or spiritual values. For example, Indian University Commission (1948-49) used the term 'Religious Education" The Secondary Education Commission (1952-53) under the title of 'The Education of Character' used 'Religious and Moral Instructions'; and Indian Education Commission (1964-66) recommended education in 'Social, Moral, and Spiritual Values'. The National Policy on Education (NPE) 1986 has been a landmark in the history of value education as it laid a considerable emphasis on value education. The NPE, 1986 visualized the education as fundamental to all round development, material and spiritual, and unique investment in the present and future. It emphasized the need for adjustment in the curriculum in order to make education a forceful tool for the cultivation of social and moral values. The National Curriculum for Elementary and Secondary Education- a Framework (NCERT,1988), the syllabi and textbooks in various subjects taught at the school level were guided by the recommendations of NPE 1986.

The recent developments in value education are 'Eighty First Report on Value based Education' (also known as Chawan Committee Report) presented to the Rajya Sabha on 26th January 1999 and the National Curriculum Framework for School Education (NCFSE) 2000 developed by NCERT. The Chawan Committee after examining the entire gamut of value orientation of our educational system recommended that truth, righteous conduct, peace, love and non-violence as the core universal values can become foundations for building the value-based educational programme. The five universal values according to the report represent the five domains of human personality, intellectual, physical, emotional, psychological and spiritual and are correlated with the five major objectives of education, namely knowledge, skill, balance, vision, and identity.

The NCFSE (2000) tends to provide a fresh look to various educational issues including value education. Besides including values mentioned in the curriculum framework (1988) and Chavan Committee Report (1999), the NCFSE envisages that 'a comprehensive programme of value inculcation must start at the very earliest stage of school education as a regular part of school's daily routine' (p.36).

There is now, throughout the world an awakening to inculcate values not only for meaningful life but for the survival of human civilization. The Delors Commission Report (1996) "Learning : The Treasure Within" has laid emphasis on transformation and humanizing education so that it can contribute to the creation of a consciousness, a peaceful and conscientious world community. The UNESCO/APEID-IER- A Joint Study of Asian Countries held at Tokyo, Japan emphasized that 'In addition to education for knowing and education for doing, children should receive education for becoming". An international initiative "sharing of our values for better world" was launched on the occasion of fifteenth anniversary of the United Nations which emphasized on the development of twelve core values that are fundamental to the well being of the humanity as a whole. These values are- co-operation, freedom, happiness, honesty, humility, love, peace, respect, responsibility, simplicity, tolerance and unity.

The recommendations of various committees and reports mentioned above are based on the belief that education is a vital medium to inculcate values among students and it has the potentiality to develop strong and abiding values. The education which is aimed at all round development of an individual including physical, intellectual, moral and spiritual development has to be value based. It implies that all the subjects and activities conducted in the school have value implications and science education is not exception to it. Science includes attitudes and behaviour of people as much as it does a body of facts and generalizations. It is a way of thinking, way of feeling and even more important a way of behaving toward people, toward things and toward oneself.

Values of Science

Values are not strange to science. Science and its pursuit not only include all the traits of morality but also develop them. While science does not directly impose values, it creates conditions which demand the reinterpretation of old values or the formation of new ones (Hurd, 1975). In an essay 'Education and the Spirit of Science' by Education Policies Commission of National Education Association, 1966 (Hawkins, 1966), the following values of science were identified.

- Longing to know and to understand
- Question of all things.
- Search for data and their meaning
- Demand for verification
- Respect for logic
- Consideration of premises
- Consideration of consequences.

The essay also suggested that these values and associated modes of thought may in the long run "be more important to mankind and to education than the visible fruits of scientific and technological pursuits". These values were later on referred in a number of articles on values.

Abruscato (1972) identified seven values as truth, freedom, skepticism and originality, order and communication. He also attempted to relate it to instructional methods and curricula. Deliberating on the liberal education values of science, Kline (1965) used one word 'rationalism' to stand for all the values such as critical attitude; independence of mind; open-mindedness, a reasoned approach to problems; a willingness to look at the facts either as a test of beliefs or as support for beliefs; and a sympathy for strange ideas.

Looking critically at science as a human activity and its role in society as evolved in the historical contexts, Mendelsohn (1976) identified four values. First value is 'modesty' i.e. arrogance must be replaced by modesty. Second is 'asscessibility', i.e. accessibility of science, for those who have been left out by historical evolution of science and institutionalization. Third, science must be reconstructed to be non-violent, non-coercive; non-manipulative, and fourth value is harmony with nature.

According to Brown and Brown (1972) "scientific values " may be perceived in terms of society, or in terms of certain characteristics of the persons involved. However, they are perceived or expressed, explicitly in the doctrines of scientific method or implicitly in the everyday behaviour of men of science: scientific values, as such are deeply rooted and therefore, profoundly influential in an individual's decisions on both small and grand scales.

There are a few attempts to study the personalities of persons involved in science in order to understand values of science. With a purpose to present a delineation of scientists' personal value structures, Brown and Brown (1972) prepared a 'scientific values- semantic differential instrument' which included a set of ten value concepts selected as relevant to the domain of science. These value concepts are : Cause and effect, commitment and persistence, creativity, curiosity, experimental verification, integrity, intellectual and personal honesty, objectivity, open-mindedness, skepticism. In a study on scientists, Roe (1961) pointed out that personality patterns of creative scientists are quite distinctive. She made the following observations :

- Scientists are independent and self-sufficient; they exhibit high autonomy and dominance; are bohemian or radical; and do not consider themselves subject to group standards.
- Scientists prefer resolvable disorder; they have high tolerance for ambiguity.
- Scientists have strong egos; they are independent in thought and action, and are not introspective.
- Scientists do not value interpersonal relationships; they are ungregracious, asocial.
- Scientists show a preference for things and ideas; they dislike emotionality.
- Scientists value risks involving nature but not people.

The profile of scientific personality presented in Roe's study gets support from the findings of Rokeach's (1973) survey on values of science teachers as compared to general public. Terminal values of science teachers reported in the study were- an exciting life, a sense of accomplishment, a world of beauty, freedom, inner harmony, mature love, self-respect and wisdom. The instrumental values included capable, imaginative, independent, intellectual and logical. Similar result were reported by Welch (1973) on values of science teachers. According to Vaidya and McIntyre (1998) , the human dimension of science might be best understood by a study of the men and women of science whose lives exemplied qualities which contributed to their special role in scientific enterprise". Vaidya and McIntyre (1998) presented an impressive analysis of lives of eminent scientists of the stature of Marie and Pierre Curie, Joseph Niepce, Card Wilhelm Scheele, Joans Edward Salk, J.D. Watson and some of the Nobel prize awardees with a view to highlight some of the exemplar personal qualities of scientists that help to define science. Their list of characteristics of scientists included commitment, persistence, aggressiveness, creativity, observant, attentive, thoughtful, quantitative, organized, self-assured, risk takers, willingness to learn and practical. Though the studies of this nature are very interesting, motivating and valuable, and influence the behaviour of students, they are stray. There is evidence (Handley and Bledsoe, 1968 and Rothan, 1973) that students do acquire the values of scientists and science teachers.

Emphasis on Values in Science Education

Development of values through the subject of science is not something new. As early as in 1927, Cureton (Quoted by Heiss, Obourn and Hoffman, 1950) found the following to be the most important objectives for teaching general science to the elementary school students :

(i) Appreciation of the value and importance of science as it affects his daily life so that he may acquire the proper attitude toward those civic-scientific issues which he will later be called upon to lend his voice in solving.

(ii) To develop in the child those general attitudes and habits of broad-mindedness, fidelity to truth, careful inquiry and evaluation of evidence in connection with problems and logical analysis of data, which will tend to mould his character and temperament in the best manner.

(iii) To develop in the child an interest in the value, worth, and beauty of science, to the end that he may have opened before him a greater number of interesting avocations and that he may be stimulated to go further into one or more of the many fields of scientific endeavour.

(iv) To develop in the child those particular habits and attitudes, and to present him those particular facts and principles most likely to be of definite use to him both as a child and as an adult.

(v) To give the child general preview of science to the end that he may have better basis for the selection of further science work in school and perhaps in life.

These objectives in fact speak about value based science education. Till 1950s as evident from the writings of Blough (1948), Watkins and Perry (1941), Beauchamp, Mayfield, and West (1941) (all quoted by Heiss Obourn and Haffman, 1950), the objectives remained more or less the same. In the 1960s , the goals of science were characterized by an emphasis on processes and techniques to produce scientists (Anderson, 1983; Johnson, 1962, and Boulas, 1964) and there was hardly any concern for the interrelationship of science technology and society. Therefore, the science education remained concerned with imparting knowledge and facts as the goals of science did not include aspects related to affective learning which direct behaviour of an individual and result in building a firm value system.

Concern for emphasis on values in science education (Kline, 1965; Harmin, Kischenbaum and Simon, 1970; Bronowsky, 1971 and Abruscato, 1972) appears to be due to the fast changing conditions of life the world over during past decades which influenced the goals of science education. Science educators in the 1980s advocated new goals that address need for scientifically and technologically literate populace (Hofstein & Yager, 1982, and White, 1988). Value emphasis in science education is the outcome of such thinking.

In India, emphasis to unite scientific values and other human values for meaningful life began with the observations of the Indian Education Commission (1964-66). It pointed out : "Man's knowledge and mastery of outer space and his own self are out of balance" (p.38). "We believe that India should strive to bring science and the values of spirit together and in harmony" (p.38). And it further adds "We can harness science to support rather than weaken our basic commitment to cultural and spiritual values (p.38).

The objectives of science education at school level underwent a major change with development of National Policy on Education (NPE) 1986 and its recommendations. The National Curriculum for Elementary and Secondary Education- A Framework (1988) which incorporated the major thrusts and recommendations of the NPE 1986 focusses heavily on value dimensions of curriculum. With regard to the subject area of science the objectives mentioned in the National Curriculum Framework are :

> "Education in Science should aim at developing well defined abilities in cognitive, affective and psychomotor domains such as spirit of inquiry, creativity, objectivity, the courage to question and aesthetic sensibility. Programmes in science education should be designed so as to enable the learner to acquire problem solving and decision making skills and to discover the relationship of science with health, agriculture, industry and other aspects of daily life. Scientific knowledge and skills should help an individual to question the existing beliefs, prejudices and act as a librating force. They should also help him/her to search for truth, harmony and order in different aspects of life".

The textbooks cannot be separated from the national curricular framework. The science textbooks presently in use were developed on the lines of NPE (1986) and the objectives communicated in the National Curriculum for Primary and Secondary Education – A Framework (1985, Revised,1987). NCERT also developed detailed curricular guidelines for First Ten Years of Schooling (1987) and Syllabus of Science for Upper Primary Level (1987) and for Secondary Level for guiding the development of instructional materials. The textbooks in science prepared by NCERT are expected to emphasise values related to science. In fact, the science textbooks of all the classes from VI to X have specially highlighted the "Science related values" in a separate page before starting the content as stated below :

> "Curiosity, quest for knowledge, objectivity, honesty and truthfulness, courage to question, systematic reasoning, acceptance after proof/verification, open-mindedness, search for perfection and team spirit are some of the basic values of science. The processes of science which help in searching the truth about nature and its phenomena are characterized by these values. Science aims at explaining things and events. Therefore to learn and practice science :
>
> - Be inquisitive about things and events around you.
> - Have the courage to question beliefs and practices.
> - Ask 'what', 'how' and 'why' and find your answers by critically observing experimenting consulting, discussing and reasoning.
> - Record honestly your observations and experimental results in your laboratory or outside it.
> - Repeat experiments carefully and systematically if required, but do not manipulate your results under any circumstance.
> - Be guided by facts, reasons and logic. Do not be biased in one way or the other
> - Aspire to make new discoveries and inventions by sustained and dedicated work."

Need for the Present Study

All educational activity makes use of texts (Kumar, 1989). Therefore, evaluation, review and analysis of textbooks is important to improve the textbooks. Science textbooks are widely used in science courses (Exline, 1984; Harms and Yager, 1981); thus they convey a great deal of the scientific information that students receive. They also influence how students perceive the scientific enterprise. Unfortunately, many science teachers rely heavily on the assigned text, which probably gives students a false impression of nature of science (Yager, 1984). Since science textbooks play such an important role in science teaching, these aids must relate science to everyday lives and at the same time illustrate how science, technology and society are interrelated (Chiappetta, Fillman and Sethna, 1991). Textbooks in Indian system of education are important tools in the hands of students and teachers. These facilitate the teaching-learning process and also help in developing positive attitudes and values (NCERT, 1986). Even to date textbooks are the only educational literature a teacher can fall back upon, particularly in the remote and inaccessible areas. In most urban homes also there is hardly any reading material with which a learner can supplement his textbooks. No wonder then in our education system, a textbook occupies a vantage position next only to that of a teacher (NCERT, 1985). Rao (1986) in trend report on curriculum method and textbooks observed that as the textbooks and teachers' guides occupy a unique place in teaching and learning process, the selection and revision of textbooks and allied materials cannot be done in a haphazard fashion. This has to be done on the basis of a systematic evaluation and research. Realizing the importance of textbooks in teaching and learning, concerns have always been felt about quality of textbooks in order to exploit its full potential in inculcating human values. In a meeting of experts on value education on 5th August,1999 at Ministry of Human Resource Development, among various decisions on which NCERT is to take action, it was also decided that "NCERT will carry out a review of all textbooks to see the content regarding education in human values". Guided by the decision, the present study aims to find out the elements of value education in science textbooks for upper primary stage prepared by NCERT.

The need and importance of present study also lies in the fact that there is hardly any study available on examination of contents of science textbooks with respect to value emphasis. In fact, the research on values or value emphasis in science education did not draw attention from the researchers as has been noted by the reviewers (Ganguli and Vashistha, 1991; and Vaidya, 1997) with great concern. The concern of the reviewers is justified as value education occupied a central place in the national curriculum (1988) and NPE (1986) and is very much emphasized . Moreover, content analysis of textbooks and relevant literature in the light of moral issues have been identified as one of the areas for research in Fifth Survey of Research in Education (Sen,1997). Therefore, the present study was planned to analyse the science textbooks from the perspective of value emphasis.

The Present Study

In view of the above, the present study was undertaken to analyse the science textbooks for Upper Primary Stage (i.e. class VI, VII and VIII) prepared by NCERT to find out the values emphasized and the scope for some more values which could also be included.

The science textbooks of class VI, VII and VIII taken up for the study were published during the years 1987, 1988 and 1989 respectively. As mentioned earlier, these textbooks were fashioned after the NPE (1986) and Curricular Framework for Primary and Secondary Education (Revised 1987). Each textbook in 'Preface' briefs the readers about the objective of providing information, activities, examples, explanations and additional or interesting information in the textbook and how they should go about it. It also explains to them why the textbook is on science and not on physics, or chemistry, or biology.

As mentioned earlier, each textbook just before starting the contents also includes 'Science Related Values' and what the students need to do to learn and practice science. Whether the textbooks represent all these values, the study would perhaps provide the answer.

Chapter – II

Review of Related Literature

A review of the researches in the area of evaluation and analysis of textbooks reveals that a very few studies were taken up to evaluate or analyse the science textbooks. Though textbook evaluation gained importance in the country especially during the 1970s, the studies on evaluation of science textbooks remained countable. The studies available on evaluation of science textbooks included evaluation of NCERT science textbooks for class III (SCERT,, Orissa, 1975), evaluation of textbooks of environmental studies for class III and V (SCERT, AP, 1980) and evaluation of upper primary level science textbooks from the view point of gender bias and gender stereotyping. (Nayar and Jaireth, 1997).

A very few studies attempted to analayse the textbooks in science. However,these studies did not include the value dimension. Mukhopadhyay (1983) on the basis of content analysis of science textbooks developed an achievement test. Joshi (1979) developed an edit code for evaluation of science textbooks, particularly with the help of content analysis data. Ramanathan and Siddiqi (1994) analysed NCERT science textbooks of upper primary level for their representation of science and found that the textbooks give maximum importance to facts and little or no emphasis to the thought processes that operate in science or interaction of science, technology and society.

The only relevant study available on curriculum and textbooks was "Fundamental duties and value orientation in NCERT curriculum and textbooks" (NCERT, 1999). It is a detailed study of NCERT's curriculum and textbooks in science, social sciences (History, Civics and Geography), Environmental studies (Social Studies and Science) and Hindi on the coverage of Fundamental Duties. The report of the study also includes analysis with respect to Article 51 A (h) -------"To develop the scientific temper, humanism and spirit of inquiry and reform; ----------" and Article 51 A (g)--- "To protect and improve natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;-------" The report mentioned contents from the books which were directly related to the above mentioned Article (s) and found that the science textbooks provide coverage to these aspects.

The scene of analysis of science textbooks in the developed countries is also not very encouraging. Not that the studies in this area were few, the textbooks dealt with various other aspects except values. Chinnis (1963) carried out an analysis of six series of widely used elementary school science textbooks with a purpose to ascertain the manner and extent of development and grade level placement of certain physical science principles. Levin and Lindbeck (1979) analysed secondary school biology textbooks for coverage of controversial issues and biosocial problems. Prosser (1983) analysed the conceptual difficulty of physics textbook. Gannaway (1980) examained two secondary school chemistry textbooks to determine their content, objectives and pedagogical approach. Rosenthal (1984) investigated the extent to which 22 high school biology textbooks included social issues. Daugs (1984) and Cho and Kahle (1984) examined vocabulary in high school science textbooks.

Garcia (1985) analysed earth science textbooks for their presentation of various aspects of scientific literacy. Meyer, Crummey, and Greer (1988) analysed contents of elementary science textbooks to study text characteristics and comprehensibility. Anderson and Botticelli; (1990) examined the content organization in biology texts. Chiapetta et. al. (1991) developed a method to quantitatively analyse the contents of science textbooks especially those used in middle and senior high school science courses with respect to aspect of scientific literacy.

To conclude, the previous research on science textbooks yields virtually very little information on value emphasis. Except the study conducted by NCERT (1999) reported above, no studies on analysis of value emphasis in science textbooks were found in the literature. Even the NCERT study failed to provide any information on the tools and techniques used in the study. As no systematic and well designed study was available in the literature, the present study becomes all the more significant.

Chapter- III

Methodology

The present study was aimed to analyse the upper primary science textbooks to determine the values emphasized in the textbooks. The specific objectives of the study ....were to analyse the science textbooks of grades 6 to 8 prepared by NCERT to find out:

1. The values intended to be reflected in the textbooks according to the curriculum.
2. The existing value content in the textbooks; and
3. Scope for the values which could be included in the textbooks.

Design

In the present study content analysis have been used to analyse the science textbooks from the perspective of value emphasis. The major themes on values were selected from those contained in the National Curriculum for Elementary and Secondary Education – A Framework (1988)and 'Science Related Values' mentioned in the NCERT science textbooks for upper primary stage. As the textbooks contain content, activities, figures, diagrams, tables and questions to be answered etc. and all these influence the learners, analysis had taken care of all these items.

Sample :

The science textbooks prepared by NCERT for the upper primary stage (grades 6 to 8) were taken up for the study. These textbooks were published during 1987-1989 and are being presently used by the school students.

Research Questions :

The study seeks to answer the following research questions :

(i) What are the values expected to be represented in the upper primary science textbooks according to the curriculum.

(ii) What are the values actually represented in the upper primary science textbooks

(iii) What are the values which have been left out and have the scope to be included.

Tools

A framework to analyse the content of the science textbooks with respect to value emphasis was developed in order to analyse the science textbooks for class VI, VII and VIII. A list of sixteen values was prepared which according to the National Curriculum Framework (1988) were intended to be reflected through education in science especially at the upper primary stage. The list included curiosity, creativity, quest for knowledge, objectivity, honesty and truthfulness, courage to question, systematic reasoning, verification, open-mindedness, precision, team spirit, appreciation, equality of sexes, observance of small family norm, protection of environment, and perseverance. All these values were operationalised and a value framework for analysis of science textbooks was developed. The framework was discussed by three educationists and subject matter specialists. It was considered as finalized when all the three persons had agreement on the scheme of analysis. Similarly, all the three persons had agreement when analysis of four chapters from the textbooks taken up for the study was carried out simultaneously using the framework. The value framework thus finalized and used for analysis in the study has been given in Annexure-I.

Procedure

The study_involved analysis of contents of the science textbooks of class VI, VII and VIII prepared by NCERT using the framework developed for the study. Chapter-wise analysis of each of these textbooks was carried out which has been given in Annexure II. Within each chapter, para-wise analysis of the content was carried out to identify the values emphasized. The paras comprising each chapter were numbered and the values emphasized were indicated in the following manner.

Numbering the Para

(i) The paras were numbered continuously as given in the textbooks and not column wise. The para can be of one or two lines.

(ii) A para with separate lines for different points or conclusion in continuity was considered as one para only.

(iii) Paras under an 'Activity' were also considered as separate para and were numbered continuously.

(iv) The 'Box' was referred as 'Box' in the analysis but the para(s) included in the box were also numbered continuously and indicated alongwith the Box in the column 'para' in the analysis.

(v) Each one of the headings 'You know Now', 'Answer These' and 'Now Answer these' were treated as one para irrespective of the number of items included under these headings and were also numbered continuously.

(vi) 'Figures' and 'Tables' referred in a para were indicated along with the para or line (s) in the content column.'

Indication of Content and Values

The content representing values was indicated page, and para wise in the analysis under the content column (Annexure II). The content indicated was in the form of single sentence or more than one sentences, complete para or even more than one para according to the value emphasis. The indication of values emphasized against the content was given in the column 'values' in the following manner :

(i) The values were indicated against the para or sentence emphasizing the value. If whole of the para emphasized only one value, whole para was indicated with its beginning few words and the last word of the last sentence of the para.

(ii) If a value was emphasized in a single sentence of a para, then the value was indicated against that sentence and the sentence was indicated with its few beginning words and the last word.

(iii) If in continuation, more than one lines together emphasized the same value, the indication was given in the content by mentioning a few beginning words of the first sentence and the end word of the last sentence considered for emphasizing the value. Then the value was also indicated once under the column value against the sentences.

(iv) If more than one para continuously emphasized one value, all the para were indicated together under the column para. Corresponding to this in the content column, first few words of the beginning para and the last word of the last sentence of the end para were mentioned. Of course, the value emphasized was also indicated once only against these para in the column value.

(v) If more than one values were found to be emphasized in a given para or sentence(s). Then all the values emphasized were indicated against the content.

(vi) The serial number of the questions under the item 'Answer These' and 'Now Answer These' emphasizing values was mentioned in the content column and the value emphasized in the value column.

Remarks

The remarks related to appreciation, deficiency, value articulation and suggestions to strengthen the content with respect to value emphasis were also recorded under the column 'Remarks' in the analysis.

Tabulation and Analysis

The frequencies of the various values emphasized were tabulated chapter-wise for each textbook. The frequencies represented number of times a particular value was emphasized in the content. Chapter-wise total frequency and percentage frequency of the values emphasized was also calculated. The values per para were also found out. Mean and Standard Deviation were applied to identify the chapters representing high value emphasis and low value emphasis.

Chapter- IV

Results

The analysis of science textbooks prepared by NCERT for class VI,VII and VIII proceeded to address three questions. :

1. What are the values expected to be represented in the upper primary science textbooks according to the curriculum.
2. What are the values actually represented in the textbooks.
3. What are the values which have been left out and have the scope to be included.

This chapter presents the findings with respect to these three questions.

1. Values expected to be represented in the textbooks according to the curriculum

As mentioned in chapter III, 16 values were found in the curriculum (1988) which were expected to be represented in the science textbooks of upper primary stage. These values included. Curiosity, creativity, quest for knowledge, objectivity, honesty and truthfulness, courage to question, systematic reasoning, verification, open-mindedness, precision, spirit of team work, appreciation, equality of sexes, observance of small family norm, protection of environment, and perseverance. A Framework operationalizing these 16 values developed for the study to analyse the textbooks has been given in Annexure-I.

2. Values actually represented in the textbooks and the values left out

The analysis of the textbooks using the above mentioned framework gave the position of textbooks with respect to values. As mentioned in chapter III, contents of all the chapters of NCERT science textbooks of grades 6 to 8 were analysed and the analysis was carried out para-wise for each chapter to see the position with respect to values emphasized in the textbooks. The textbook wise detailed analysis of contents has been presented in the tabular form and given in Annexure II.

Table 1,2 and 3 present the consolidated picture of the analysis of textbooks of class VI, VII and VIII respectively with respect to value emphasis. Each of these tables provides chapter-wise details on the total number of paras, various values emphasized, frequency of each of the values emphasized and total frequency including percentage frequency of all the values emphasized. Each table also provides information on frequency of various values emphasized in whole of the textbook and the total frequency of all the values emphasized in the textbook. An overall picture of values emphasized in three textbooks has been presented in Table 4. The values mentioned at serial number 1 to 16 in the consist tables mentioned above consist of the values intended to be reflected in the textbooks according to the curriculum and the values from serial number 17 onwards represent the additional values found in the text during the analysis. The results on actual representation of values in the three textbooks have been presented in the following way :

- Textbook wise emphasis on values
- Overall values emphasis in the three textbooks
- Chapter-wise value emphasis

Textbook wise Emphasis on Values

Class VI textbook

The results of analysis of science textbook for class VI have been presented in Table –1 . The Table 1 revealed that the textbook for Class VI consisted of 13 chapters and the number of values emphasized in different chapters varied from 5 to 10. Out of the total number of 16 values which were expected to be emphasized in the textbook according to the curriculum, 13 values were found to be emphasized with frequency (f) range from 1 to 161. The wide frequency range indicated the extreme low or high emphasis on different values. Three values including courage to question, equality of sexes, and observance of small family norm were not found to be emphasized in the text. Among the 13 values found to be emphasized, three values had noteably higher frequency indicating that these were emphasized to a large extent. These values were – systematic reasoning (f=161), appreciation (f=157) and curiosity (f=151). These values were reflected in all the 13 chapters. Two values, namely quest for knowledge (f=53) and precision (f=45) were also found to be emphasized to some extent. While precision was emphasized in all the chapters, quest for knowledge was also emphasized in nine chapters. The remaining 8 values including creativity, objectivity, honesty and truthfulness, verification, open-mindedness, spirit of team work, protection of environment, and perseverance were found in a few chapters and had a very low frequency range (1 to 20) indicating that these values were emphasized in the content to a very small extent .

The Table 1 also indicated four additional values with frequency range 1 to 4 which the contents of class VI textbook reflected. These values included cultural heritage, social responsibility, unity in diversity, and national identity and pride and each value was represented in one or two chapters only. Thus the total number of values emphasized in the textbook for class VI was 16 having total frequency equal to 650.

Table 1-Value emphasis in science textbook for class VI

S.No	Values	Chapter wise frequency (f) of values														
		1	2	3	4	5	6	7	8	9	10	11	12	13	Total f	%f
1	Curiosity	02	13	03	07	05	13	21	48	10	04	13	09	03	151	23.23
2	Creativity	-	01	-	-	01	04	01	-	-	-	-	01	-	08	1.23
3	Quest for Knowledge	04	13	-	02	-	02	09	11	-	01	-	10	01	53	8.15
4	Objectivity	04	-	02	04	03	01	-	-	-	04	01	01	-	20	3.08
5	Honesty and Truthfulness	01	02	-	05	01	-	07	-	-	-	-	02	-	18	2.77
6	Courage to Question	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Systematic Reasoning	10	36	14	12	10	13	17	07	08	11	18	03	02	161	24.77
8	Verification	-	-	-	01	-	-	-	-	-	02	-	-	-	03	0.46
9	Open-mindedness	01	-	-	-	-	-	-	-	-	-	-	-	-	01	0.15
10	Precision	01	06	01	09	03	06	01	01	03	06	05	02	01	45	6.92
11	Spirit of Team work	-	03	-	01	-	-	-	02	-	-	-	-	-	06	0.92
12	Appreciation	10	05	06	08	01	12	09	13	19	27	21	10	16	157	23.23
13	Equality of Sexes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Observance of Small Family Norm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Protection of Environment	-	-	-	-	-	-	01	-	01	06	-	06	-	14	2.15
16	Perseverance	03	-	-	-	-	-	-	-	-	-	-	-	01	04	0.61
17	Cultural Heritage	01	-	-	-	-	-	-	-	-	-	-	-	-	01	0.15
18	Responsibility (Social)	-	-	-	03	-	-	-	-	-	-	-	01	-	04	0.61
19	Unity in Diversity	-	-	-	-	-	-	02	-	-	-	-	-	-	02	0.31
20	National Identity/ Pride	-	-	-	-	-	-	01	-	-	-	-	-	01	02	0.31
21	Total	37	79	26	52	24	51	69	82	41	61	58	45	25	658	
22	%	5.69	12.15	4.0	8.0	3.69	7.85	10.62	12.62	6.30	9.38	8.92	6.92	3.85		100.00
23	No. of Para	18	100	63	83	50	56	82	99	43	66	50	46	40	796	

Class VII Textbook

The results of analysis of science textbook for Class VII have been presented in Table 2 . As indicated in the Table 2, the textbook contains 18 chapters with number of values emphasized in different chapters ranging from 5 to 12. Out of the 6 values identified according to the curriculum, 14 values were found to be emphasized in the textbook with frequency (f) range from 1 to 221 indicating a wide difference in emphasis on various values. Two values which were not found included creativity and open-mindedness. Among the 14 values which were found to be emphasized, three values had visibly higher frequency indicating high emphasis. These values were – appreciation (f=221), systematic reasoning (f=104), and curiosity (f=100). The value 'precision' (f=59) was also emphasized to some extent. However, the remaining 10 values including courage to question, objectivity, honesty and truthfulness, verification , spirit of team work, equality of sexes, observance of small family norm, protection of environment and perseverance had very low frequency ranging from 1 to 29 indicating relatively low emphasis on these values in the contents of the textbook.

The Table 2 also indicated four additional values found during the analysis. These values included social responsibility (f=4), unity in diversity (f=3), compassion (f=2) , and cleanliness (f=2) and each value was represented in one or two chapters only. In total, the class VII science textbook emphasized 18 values with total frequency equal to 695.

Class VIII Textbook

Table 3 presents the results of the analysis of science textbook for Class VIII. As indicated in the Table 3, the class VIII textbook consisted of 16 chapters and the number of values emphasized in different chapters ranged from 6 to 11. Out of the total 16 values identified according to the curriculum for science, the textbook was found to have reflected all the values with frequency ranging from 1 to 331 except the value equality of sexes. The frequency range indicated that the emphasis on different values in the content varied to a great extent. Of the 15 values emphasized in the text, two values-appreciation (f=331) and systematic

Table 2: Value emphasis in science textbook for class VII

S.No.	Values	Chapter wise frequency (f) of values																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total	% f
1.	Curiosity	11	03	07	07	05	07	07	03	04	04	01	02	03	12	02	08	06	08	100	14.39
2	Creativity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Quest for Knowledge	05	01	05	04	01	09	03	11	-	09	02	01	08	07	08	11	08	12	105	15.11
4.	Objectivity	-	-	-	03	02	03	-	03	01	01	11	01	02	-	-	01	-	-	28	4.03
5.	Honesty and Truthfulness	02	-	-	-	-	03	-	-	-	-	-	01	02	04	04	02	01	04	23	3.31
6.	Courage to Question	-	-	-	-	-	-	-	-	-	-	-	01	-	01	-	02	-	-	04	0.58
7.	Systematic Reasoning	07	01	04	10	11	09	06	07	06	04	06	02	04	09	02	05	03	08	104	14.96
8.	Verification	-	02	04	-	-	03	-	01	02	-	07	02	-	01	-	03	01	03	29	4.17
9.	Open-mindedness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	Precision	02	04	03	03	06	08	05	02	04	06	01	03	02	01	01	03	03	02	59	8.49
11.	Spirit of Team Work	01	-	-	-	-	-	-	02	-	-	-	-	-	01	-	-	-	-	04	0.58
12.	Appreciation	04	06	12	08	09	10	05	08	07	11	13	17	11	30	12	24	15	19	221	31.80
13.	Equality of Sexes	-	-	-	-	-	-	-	-	-	-	-	-	-	01	-	01	-	-	02	0.29
14.	Observance of Small Family norm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01	-	-	01	0.14
15.	Protection of Environment	-	-	-	-	-	-	-	-	-	-	02	01	-	-	-	-	-	-	03	0.43
16.	Perseverance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01	-	-	-	01	0.14
17.	Responsibility (social)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02	02	-	04	0.58
18.	Unity in Diversity	-	-	-	-	-	-	-	-	-	-	-	-	02	01	-	-	-	-	03	0.43
19.	Compassion	-	-	-	-	-	-	-	02	-	-	-	-	-	-	-	-	-	-	02	0.29
20.	Cleanliness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02	-	02	0.29
21.	Total	32	17	35	35	34	52	26	39	24	35	43	31	34	68	30	63	41	56	695	100.00
22.	%	4.60	2.45	5.04	5.04	4.89	7.48	3.74	5.61	3.45	5.04	6.18	4.46	4.89	9.78	4.32	9.06	5.90	8.06	100.00	
23.	No. of Para	24	40	44	35	35	43	30	60	34	31	54	39	41	73	38	36	41	38	736	

Table 3-Value emphasis in science textbook for class VIII

S.No	Values	Chapter wise frequency (f) of values																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total f	%f
1	Curiosity	02	02	06	07	02	01	03	03	01	08	02	12	03	-	-	01	53	7.17
2	Creativity	-	-	-	-	-	01	-	-	01	-	-	-	-	01	-	01	04	0.54
3	Quest for Knowledge	01	02	-	02	01	01	04	-	03	02	01	06	03	03	-	-	29	3.92
4	Objectivity	-	01	02	-	-	04	06	-	09	06	02	04	03	01	02	02	42	5.68
5	Honesty and Truthfulness	-	02	-	01	-	04	-	02	-	06	01	04	-	01	-	-	21	2.84
6	Courage to Question	-	-	-	-	01	-	-	-	-	01	-	-	-	-	-	-	02	0.27
7	Systematic Reasoning	08	06	05	08	04	01	07	11	08	22	04	07	14	21	06	03	135	18.27
8	Verification	01	01	02	02	01	01	-	04	-	01	-	01	01	-	-	-	15	2.03
9	Open-mindedness	-	-	-	-	-	-	-	-	01	01	-	-	02	-	-	-	04	0.54
10	Precision	02	05	04	03	02	02	06	04	03	05	02	01	04	06	01	01	51	6.90
11	Spirit of Team Work	-	-	01	-	-	-	-	-	-	-	-	-	-	-	-	-	01	0.14
12	Appreciation	20	13	18	05	10	17	45	18	47	34	15	34	09	08	18	20	331	44.80
13	Equality of Sexes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	Observance of Small Family Norm	-	-	-	-	-	-	-	-	-	-	03	-	-	-	-	-	03	0.41
15	Protection of Environment	-	-	-	-	-	-	01	01	-	01	01	01	-	09	01	-	15	2.03
16	Perseverance	-	-	-	-	01	-	-	-	-	-	01	-	01	-	-	-	03	0.41
17	Cultural Heritage	-	-	-	-	-	-	-	01	-	-	-	-	-	-	-	-	01	0.14
18	Responsibility (Social)	-	-	-	-	-	-	-	-	-	-	-	-	-	01	-	-	01	0.14
19	Unity in Diversity	-	-	-	-	-	-	-	-	-	-	-	-	04	-	-	-	04	0.54
20	National Identity/Pride	01	02	-	-	-	-	08	01	03	-	02	05	-	-	01	01	24	3.25
21	Total	35	34	38	28	22	32	80	45	76	87	34	75	44	51	29	29	739	
22	%	4.74	4.60	5.14	3.79	2.98	4.33	10.82	6.09	10.28	11.77	4.60	10.15	5.95	6.90	3.92	3.92		100.00
23	No. of Para	39	68	45	43	22	35	85	77	83	64	65	83	50	47	66	15	887	

reasoning (f=135) had relatively very high frequency indicating the high emphasis on these two values in the content.. The frequency of three values, namely, curiosity (f=53), precision (f=51) and objectivity (f=42) also indicated the representation to some extent of these values in the content. The remaining 10 values including quest for knowledge, honesty and truthfulness, courage to question, verification, open-mindedness, spirit of team work, observance of small family norm, protection of environment and perseverance had low frequency ranging from 1 to 29 indicating very little emphasis on these values in the content.

As indicated in Table 3, four additional values were also identified as emphasized during the analysis of science textbook for class VIII. These values included cultural heritage, social responsibility, unity in diversity, and national identity and pride. However, except national identity and pride (f=24) which was emphasized in nine chapters of the textbook, the other three values were found in three different chapters and had relatively low frequency (1 to 4) indicating the emphasis on these values in the textbook to a very small extent. In short, the class VIII textbook emphasized 19 values with total frequency equal to 739.

Overall Value Emphasis in Three Textbooks

The combined picture of the values emphasized in all the three science textbooks for class VI, VII and VIII has been presented in the Table 4 . As shown in the Table 4, the total number of values emphasized collectively in these books were found to be 22 in the analysis. This number included all the 16 values intended to be reflected in the science textbooks according to the science curriculum thus proving that the NCERT science textbooks of upper primary stage did represent the values mentioned for this stage in the curriculum framework for the subject of science.

Like the individual textbooks, the range of total combined frequency of different values for all the textbooks was also quite large i.e. 2 to 709 (10.1% to 34.02%) which again indicated that there was extremely high emphasis on some values and extremely low emphasis on the other values. Values such as appreciation (f=34.02%), systematic reasoning (f= 19.2%) and curiosity (f=14.59%) represented highly emphasized values. Values like quest for

Table 4: Value represented in the science textbooks for upper primary stage

S.No.	Values	Textbook-wise frequency (f) of values				
		VI	VII	VIII	Total f	% f
1.	Curiosity	151	100	53	304	14.59
2.	Creativity	08	-	04	12	0.58
3.	Quest for Knowledge	53	105	29	187	8.97
4.	Objectivity	20	28	42	90	4.32
5.	Honesty and Truthfulness	18	23	21	62	2.98
6.	Courage to Question	0	04	02	06	0.29
7.	Systematic Reasoning	161	104	135	400	19.20
8.	Verification	03	29	15	57	2.26
9.	Open-mindedness	01	00	04	05	0.24
10.	Precision	45	59	51	155	7.44
11.	Spirit of Team Work	06	04	01	11	0.53
12.	Appreciation	157	221	331	709	34.02
13.	Equality of Sexes (Gender Equality)	00	02	00	02	0.1
14.	Observance of Small Family Norm	00	01	03	04	0.19
15.	Protection of Environment	14	03	15	32	1.54
16.	Perseverance	04	01	03	08	0.38
17.	Cultural Heritage	01	-	01	02	0.1
18.	Responsibility (Social)	08	-	04	12	0.58
19.	Unity in Diversity	02	03	04	09	0.43
20.	National Identity/Pride	02	-	24	26	1.25
21.	Compassion	-	02	-	02	0.1
22.	Cleanliness	-	02	-	02	0.1
23.	Total	650	695	739	20.84	99.99
24.	%	31.39	33.35	35.46	100.00	

knowledge (f=8.97%) and precision (f= 7.44%) were also represented to some extent but the remaining values had very low frequency ranging from 0.1% to 4.32% indicating very low emphasis on these values in the texts.

Among the six additional values found represented in the textbooks, the value of social responsibility and unity in diversity were found in all the three textbooks, cultural heritage and National identity & pride were emphasized in textbooks for Class VI and VIII while the value of compassion and cleanliness were emphasized in textbook for Class VII only. Though the frequency range of these additional values (f=2 to 26) was found to quite low, the representation of these values in the textbooks indicated that content had scope for some more values.

The Table 4 also shows the textbook- wise total value emphasis in frequency percentages which were approximately same i.e. in thirties. Similar trend could be observed in frequency per para in these three textbooks as given in Table 5. The number of values per para in each of the three textbooks and number of values per para collectively in all the three textbooks were also quite similar. These results indicated that all the three textbooks emphasized values to more or less the same extent.

Table: 5 Values per para in the science textbooks

Textbook for Class	Total no. of para	Total value emphasis(f)	Value emphasis per para
VI	796	650	0.82
VII	736	695	0.94
VIII	887	739	0.83
Total	2419	2084	0.86

Chapter-wise Value Emphasis

As mentioned in the beginning of this chapter, Table 1.2 and 3 also presented chapter-wise total frequency of the values indicating value emphasis in different chapters in the textbooks of class VI, VII and VIII respectively. As there was a lot of variation in the chapter-wise position with respect to values, the chapters representing both high value emphasis and low value emphasis were identified (based on Standard Deviation). Table 6,7 and 8 provide information on the chapters found to be representing high and low value emphasis in the science textbooks for Class VI, VII and VIII respectively.

Table 6 : Chapters in Class VI Textbook representing high and low value emphasis

Value Emphasis	Chapter No.	f	Title of the chapter
High	2	79	Things Around Us.
	7	69	The Living World
	8	82	Structure and Functions of Living Body
Low	3	26	Separation of Substances
	5	24	Changes Around us
	13	25	The Universe

Mean = 50 **SD=18.74**

Table 7 : Chapters in class VII textbook representing high and low value emphasis

Value Emphasis	Chapter No.	f	Title of the chapter
High	6	52	Light and Shadows
	14	68	Life Processes
	16	63	Food
	18	56	Soil
Low	2	17	Elements compounds and Mixtures
	9	24	Electric charges at Rest

Mean =38.61 **SD=13.04**

Table :8 : Chapters in Class VIII textbook representing high and low value emphasis

Value Emphasis	Chapter No.	f	Title of the chapter
High	7	80	Rocks, Minerals and Metals
	9	76	Man-Made Materials
	10	87	Microbial World
	12	75	Useful Plants and Animals
Low	5	22	Magnetism

Mean = 46.19 **SD=20.55**

As indicated in Table 6, three chapters represented high value emphasis and an equal number represented low value emphasis in science textbook for Class VI. Similarly, four chapters in science textbook for Class VII represented high value emphasis and two chapters represented low value emphasis as shown in Table 7. Table 8 reveals that in science textbook for Class VIII, four chapters represented high value emphasis and only one chapter represented low value emphasis. An examination of Tables 1,2,3, with respect to the number of different values represented in chapters with high and low value emphasis revealed that number of values emphasized in the chapters having high value emphasis ranged from 6 to 10 while the number of values emphasized in chapters with low value emphasis ranged from 5 to 7. But more than the number of values, it was high frequency of some of the values such as appreciation, curiosity, systematic reasoning and to some extent frequency of the value quest for knowledge which contributed to the high or low value emphasis status of different chapters. Not only that, there is in general low frequency of all the values represented in the chapters having low value emphasis .

Chapter V

Discussion

The results of the study have established that the science textbooks prepared by NCERT for the upper primary stage collectively represent all the values (n=16) expected to be emphasized in the science textbooks according to the National Curriculum Framework (1988). These values include curiosity, creativity, quest for knowledge, objectivity, honesty and truthfulness, courage to question, systematic reasoning, verification, open-mindedness, precision, spirit of team work, appreciation, equality of sexes, observance of small family norm, protection of environment, and perseverance. The results also establish that the total emphasis on values is nearly equal in all the three textbooks. As one of the objectives of curriculum and syllabus of subject of science at upper primary stage is to develop scientific attitudes and values, it can be said that through value emphasis in the science textbooks an attempt has been made to achieve that objective.

The findings of the study get support from the findings of the report 'Fundamental Duties and Value Orientation in NCERT Curriculum and Textbooks' (1999) which is based on the detailed analysis of NCERT's curriculum, syllabus and textbooks in Science, Social Sciences, Environmental Studies and Hindi in relation to the coverage of each clause of Article 51a (on Fundamental Duties). With respect to development of scientific temper and spirit of inquiry (Article 51 A (h), the report concludes that the science textbooks provide an adequate coverage to various components of the clause. Also with respect to emphasis on 'Protection and improvement of natural environment' (Article 51 A (g), the report concludes that the syllabi and the textbooks have provided adequate knowledge base and understanding of complex interrelation between the various components of the natural environment, necessary skills and ethical guidance in matters related to the protection of natural environment.

There is a great variation in the extent to which different values have been emphasized in the textbooks. Some of the values such as appreciation, curiosity and systematic reasoning are found to be emphasized to a great extent in the textbooks. On the other hand some of the values including creativity, objectivity, honesty and truthfulness, courage to question, spirit of team work, equality of sexes, observance of small family norm, protection of environment and perseverance are found to be represented relatively to a very small extent. In fact the different values get represented to different extent depending upon the nature and scope of the topic and contents.

There is also a lot of variation in the total value emphasis of different chapters in the textbooks. Though all the chapters provide scope for inclusion of values, some chapters in the study have been found to have high emphasis on values. The nature of the contents of these chapters reveals that the chapters having high value emphasis have either biological or general orientation. For example Chapter 8 entitled "Structure and Functions of Living Body" (Class VI) and Chapter entitled "Rocks Minerals and Metals" (class VIII). On the other hand, the chapters having chemistry or physics orientation, such as, Chapter 3, "Separation of Substances" (class VI), and Chapter 5 "Magnetism" (class VIII) have low value emphasis. It means that the contents devoted to nature and natural things or of integrated type are more suitable for value emphasis in comparison to the contents related to physics or chemistry. As indicated in the syllabus (NCERT 1987) an integrated approach has been attempted in order to portray "science" as a single discipline at the upper primary stage avoiding its compartmentalization into physics, chemistry or biology, but an extreme stance to present a totally unified and integrated approach has been avoided. That is why some chapters have general orientation while others have retained their physics, chemistry or biology character and that creates difference in value emphasis. The integration helps in value development. The chapters such as "Force and Motion" (Physics) have less scope for integration and therefore less scope for value emphasis. The NPE (1986) also states that science should be relevant to life. Therefore, the content of science textbooks if related to life situations (i.e.integrated) has scope for value development. For example, in chapter entitled "Water" (Class VI), which has high emphasis on values, the student experiences it as 'water' not as physics, chemistry or biology. The student not only knows its components but also knows from where it is obtained, how it is contaminated and how to keep the water clean. Therefore, it has scope for inculcation of values. Perhaps increased integrated approach may help to better value emphasis .

The nature of the content also influences the number of values represented in a chapter. The range of number of values represented in various chapters of the textbooks is five to ten. Thus, not even a single chapter in these textbooks reflected all the sixteen values. Further, some values are emphasised more in certain kind of chapters while other values are reflected in certain other kind of chapters. The most emphasized value like appreciation, for example, which is represented in all the chapters of the three textbooks has a vide variation in emphasis. For example, in the textbook for class VI 'appreciation' is emphasized once in chapter number six entitled 'Motion, Force and Machine' while in chapter number 10, entitled 'water', it is emphasized 27 times. The extreme high or low emphasis on a value in the content depends on two things – (1) the potentiality of the content for inculcation of that value and (2) the usage (exploitation) of the content for value inculcation. The following discussion may help throw some light on this matter.

In case of the three most emphasized values namely appreciation, curiosity and systematic reasoning, the nature of content and its utilization seems to be quite appropriate as these values are represented in almost all the chapters of the textbooks. However, there are certain values like objectivity, honesty & truthfulness, perseverance, quest for knowledge, protection of environment, verification, open-mindedness, spirit of team work etc which seem to have more scope than these are emphasized in the textbooks. For example, at a number of places in the textbooks, the students have been asked to 'observe' and they are not further asked to 'record', 'list' and 'report' etc which if included alongwith 'observation' can emphasise the value 'honesty and truthfulness'. In addition to it, if students are asked to do the experiment carefully and systematically and not to manipulate the results, the 'objectivity' could also be emphasized. However, the textbooks seriously lack in this kind of approach and perhaps it has been presumed that by asking students to observe carefully the students will conduct whole of the activity objectively and therefore the value of objectivity will develop. Similarly, the value 'perseverance' has been emphasized in the textbooks in the context of scientists' contributions, their hard work, motivation and persistent efforts. However, at number of places, there is only 'appreciation' of the contributions of scientists but not a mention of other related behaviours mentioned above which if included could increase emphasis on the value 'perseverance' in the textbooks.

The textbooks for class VI and VII suggest some activities or provide suggestions for further observation, exploration and experimentation etc which emphasise the value 'quest for knowledge'. For example, in Activity 4 (class VII page 23) showing reactions of alkalies with acids it is mentioned 'similar activities can be performed with other acid and alkali solutions'. Also followed by this is a question (page 24)'Mention some of the salts which you come across in daily life' There is scope in the content to include more activities of this type and also to include such activities in the textbook for class VIII where this type of activities are missing.

So far as the value of 'protection of environment' is concerned, the textbooks provide a lot of information about environment and resources but only at a few places there is emphasis on concern for maintenance of environment or on preventive aspects for conservation of environment where the value has been noted in the study . Therefore, the value emphasis could be suitably increased in the content. Another value in which case there is scope in the books but have not been utilized is 'open-mindedness'. At some of places, the students have been asked 'compare your results with others'. To emphasise open-mindedness one or two sentences could be added there, such as, ' If your and others' results are different, why they are different ?' 'Do you think to revise your observations ?' 'Discuss if the results/observations are different.' The value can also be emphasized wherever the achievements or work of scientists is mentioned by stating the related facts about scientists accepting criticism and trying to explore further or correcting themselves if convinced.

The 'verification' of the facts lacked because of the lack of independent activities meant for the purpose in the textbooks. However, many activities had the scope for verification but failed to emphasise the value due to lack of one or two appropriate sentences indicating that 'you can test or see it yourself and verify it' or 'one needs to test the idea before accepting it'. For example, Activity-1 'Teacher Demonstration' (Class VII, p.124-125) on photosynthesis with a potted plant emphasizes the value 'systematic reasoning' where the students learn to conclude that sunlight is necessary for photosynthesis and leaves make starch as food (iodine test) The demonstration could be used for emphasizing the value of verification also if one or two sentences before the iodine test like, 'Let us verify it' or 'we can prove it' were added .

The activities given in the textbooks involving student participation are limited. Only one chapter in class VIII textbook and three chapter in each of the textbooks for class VI and VII have tried to emphasise the value 'spirit of teamwork.' But the value reflected is at a very superficial level. Given below is Activity – 5 (Class VII, page 131) as an example:

> "Count how many times you breathe per minute (i) at rest, and (ii)after doing a 20 sit-up exercise. Compare your results with those of yours friends".

To increase emphasis~~e~~ on the value the way it is mentioned above is not difficult in the present textbooks. However, in order to promote spirit of team work, the activities are required to be deliberately designed in such a way that it provides students opportunities to work together, analyse together and formulate conclusions.

The contents provide limited scope for representation of some of the values, such as, courage to question, observance of small family norm and equality of sexes. So far as the value 'courage to question' is concerned, the topics on which the chapters have been written do not have much scope for inclusion of this value. However, wherever some possibility exists in the content , that has not been fully utilized to emphasise this value. For example, the heading 'The Eclipses' (Class VII, page 51-54) had the scope to emphasise the value through scientifically questioning and answering the beliefs related to eclipses which has not been utilised. Similarly, under the heading 'Electricity in the sky' (Class VII, page 81-82), the beliefs related to electricity i.e. lightening in nature have not been pointed out though the process of lightening and precautions to be taken during lightening do find a mention. The scope for emphasizing the value ' observance of small family norm' is also very much limited as this value could be emphasized only with respect to containing overpopulation and effect of small family on the improvement of life of an individual and society which can not be the subject of large number of chapters in a textbook. The present textbooks lay direct emphasis on reducing the rate of growth of population and not on observance of small family norm (p.173-174,Clas VIII). Therefore, the value emphasis found is quite appropriate to the content. Science being gender neutral the value 'equality of sexes' has been very objectively emphasized in the content wherever it could be possible. For example, mention of balanced diet includes diet of both a boy and a girl of 12 years of age. Therefore, it could be said that already gender equality or gender neutral approach has been followed in the textbooks and no such bias is found.

The value 'creativity' which is quite basic to science has been neglected in the content and the content does not provide much scope for it. The opportunities for original thinking, exploration and observation which could lead to development of creativity among students are some how or the other missing in the content.

The textbook contents apart from emphasizing the science related values also have the capacity to emphasise some more human values has been indicated by the six additional values which have also been found reflected in the textbooks during the analysis. These values include cultural heritage, social responsibility, unity in diversity, national identity and pride, compassion, and cleanliness, which have also been mentioned in the curriculum framework (1988) though not specifically with reference to the subject of science. However, the representation of these values is extremely low and limited to one or two chapters in the textbooks where the nature of content provides scope for emphasis on these values. For example, the value 'cultural heritage' is represented in only one chapter of the class VI and VIII textbooks. The value has been emphasized with respect to Indian contributions, for example, Indian method of curing diseases known as Ayurveda discovered by ancient Indian scientists and some other contributions of well known Indian scientists (class VI, chapter 1).

The value 'social responsibility' is emphasized directly under the heading 'Our Responsibility' (Box, chapter 16, class VII) where it is mentioned how we can help solve the country's food problem. The value has also been emphasized with respect to keeping houses, colonies, streets and towns clean in order to have proper health of the whole community (chapter 17, class VII) and 'ensuring use of right weights and measures' (chapter 4, class VI). Therefore, it can be seen that the value has the scope for emphasis wherever the content is related to people's needs, their health or consumer behaviour.

The value 'unity in diversity' in science textbooks has been emphasized in the chapters related to biology, such as 'The Living World' (Class VI), 'Organisation of the Living Body' and 'Organic Revolution' (class VIII). The emphasis is basically on common characteristics, common needs and common basic activities of all living things along with some variations or dissimilarities. Therefore, the value has limited scope for emphasis i.e. through knowledge on living things only.

The value 'National Identity/Pride' has been emphasized in the textbooks through knowledge and information about India's position in the world with respect to its rich mineral resources (class VIII, chapter 7), its dams (class VIII, chapter 7), its production of goods and spices, and its exports (class VIII chapter 12), and the satellites built and launched (class VI, chapter 13) etc. The information about treasures and achievements make students feel proud of the standing of our country in the world. However, this value has more scope for emphasis than utilized as at a number of places in the textbooks, the indigenous knowledge is given without any value leaden statement, word or remarks. For example, the statement "Indian reserves of coal are about 83,00,00,00,000 tonnes" (Class VIII, page 227) does provide information about the coal reserves but not about India's position in the world with respect to this possession.

There are two values – 'compassion' and 'cleanliness' which have been represented in only class VII textbook in two different chapters. The value 'compassion' is directly emphasized through creating concern for those who cannot hear (chapter 8 page, 73). The content not only makes the students aware of the difficulties of deaf-mute but also the efforts of these people to learn and lead full life. The students are also asked "Try and visit one such school nearby for the deaf-mute. Share their joys, and yes their sorrows too". Similarly, there is direct emphasis on 'cleanliness' in the chapter entitled 'Health and Diseases' (Class VII). The text emphasizes that the best way to proper health of the whole community is through cleanliness and it also lays stress on keeping environment (i.e. houses, colonies, streets, towns) clean and not only personal cleanliness. (page 182) The identification of the above mentioned six additional values in the content conveys that the science textbooks have the potential to represent some more values. One perhaps needs to have the value focus in mind.

There are many other aspects of the textbooks which also need to be commented upon in order to develop better understanding of the present status of value emphasis in the textbooks. The analysis of the textbooks reveals that the focus of the content is on knowledge aspect rather than processes of science. Due to this reason, the different values related to the processes, such as, creativity, objectivity, honesty and truthfulness, verification, precision, and quest for knowledge etc receive less weightage. Though the objectives of the science curriculum are to emphasise the uniqueness of the processes of science and the guidelines for syllabus framers and textbook/writers (NCERT, 1986) and 'Preface' of the science textbooks for class VI, VII and VIII also sought to emphasise the same, the presentation of the content does not lay adequate stress on the investigative processes. The observation is also corroborated by the findings reported in a study of NCERT upper primary science textbooks (Ramanathan and Siddiqui,1994) where the researchers indicate that the NCERT textbooks devote only 14.71% of the total text to investigative nature of science in comparison to knowledge aspect of science which receives almost two-thirds coverage of the total text. The investigators are of the opinion that the emphasis on processes can only be given if the content is reduced.

Like the Curriculum Framework of 1988 the new curriculum NCFSE (2000) also lays stress on teaching and learning of science by focussed emphasis on processes of science. It is observed that the process skills acquired would help in developing attitudes and values that constitute the spirit of scientific temper (p.59) With respect to knowledge aspect at the upper primary stage, the new curriculum suggests that "instead of loading the students with scientific information, efforts should be made to help them learn key concepts which would cut across all the disciplines of science. This would generate curiosity and would enhance awareness and understanding" (p.61).

Another important area of learning which has received very little attention in the textbooks is the interaction of science technology and society. The science education at upper primary stage should help learner to develop an understanding and appreciation of the joint enterprise of science and technology and the inter relationship of these with other aspects of society was envisaged in the curriculum framework 1988. Inspite of that, about 18% of textbooks contents are devoted to this aspect (Ramanathan and Siddiqui 1994). The need and importance of teaching of science in relation to society, technology and people in an integrative mode to solve many problems of human concern has been suggested by Hurd (1975) in the light of stress given on the subject in various writings on science curriculum and human values. Realising the importance of science and technology in the changing conditions of life today and for improvement of the human life, the NCFSE (2000) has emphasized 'Science and Technology' education up to the secondary stage instead of 'science' education. The curriculum stresses that "the learners have to understand how basic scientific principles are applied in finding solutions to problems in the field of agriculture, energy, health and nutrition, industry, defence, information processing and other areas of human concern" (p.58). The NCFSE also lays stress on inclusion of rural and tribal technology as an important part of science and technology education. The new curriculum has paved the way for humanizing science. Now it is for the textbook writers to make it possible through preparation of the effective learning material for students. Following are some general observations and comments on different content areas including activities, questions, and boxes etc. of the textbooks :

Activities : The textbooks contain a number of activities and the students have been asked in the beginning (preface) of the textbooks to do as many activities as they can as doing experiments and analyzing the results is an important part of science. However, in order to be effective, there is need to improve the activities and the teacher demonstrations. Some of the activities and teacher demonstrations are poor as they are not linked properly with the purpose to be achieved. For example Teacher demonstration – 'Test for Proteins (Class VII p.164-165). Given below is the 'Procedure' from the text:

> Procedure : "Put a small piece of the egg-white in the test tube and add a few drops of the acid and heat. Do not boil Note that colour of the egg white has become yellow now. Decant the acid into a beaker of water to dilute and discard it, but keep the egg white in the tube. Now add a few drops of ammonium hydroxide to the egg white and note the colour. It has now turned violet".

From the above procedure, it is not clear how it is a test for proteins. Even the information about proteins given before the Teacher Demonstration does not convey anything related to the test. Therefore, the teacher is required to explain to the students the reasons for the changes taking place in the experiment and the inferences to be drawn.

It would have been better if two or three lines on reason for change in colour of egg white in both the situations in the experiment and what it proves were given in the text.

Sometimes the activities given are quite interesting but these are not linked with information given prior to the activities. For example, Activity 8 (page 158, Class VII Chapter: Life Processes-II)

> "Measure the length of the head and the whole body of a small baby (say 6 months – 1 year old). You will see that the head is quite large compared to its body. Repeat the same for an adult. You will notice that head is much smaller compared to the whole body. It shows that the head stops growing in size after certain age but other parts grow for a little longer".

In the 'Development' mentioned above the activity, nowhere it is indicated that such things happen. The students are also not asked to observe which parts stop growing in size after certain age. The information is required to be linked for students to understand and develop interest.

Some of the activities in the textbooks have been given in such a way that there may be many observations and conclusions from an activity. Given below is Activity 3 (Class VI, p-95) as an example :

"What kind of food do the following animals eat ?
Sparrow
Rabbit
Tiger
Frog
Honeybee
Goat
Ant
Elephant
Vulture
House Lizard
Fish
Rat
Bear
Snail"

In the above activity nowhere the students have been asked to compare the kind of food and life styles and habits of the animals mentioned . Neither this type of explanation is there before the activity. But the line following the activity states -"The living objects need different types of food according to their life-styles and habits".
Following this, the next sentence also introduces different concept - "Do plants eat or produce food ? The green plants manufacture their own food".

This concept requires elaboration under a separate heading in the textbook as well as orientation to the teachers on desired outcome of the activity.

Answer These

The text includes questions to be answered by the students in each chapter under the heading 'Answer These' at the end of each 'section' of the chapter and then under the heading 'Now Answer These' at the end of each chapter. Most of the questions under both the headings are generally based on textbook knowledge and demand recall type answers. However, some of questions do require reasoning either by directly asking for the reasons, for example, "Describe briefly the reasons for increasing need for energy sources" (Class VIII page 235, Question No.2), or indirectly by starting with 'why' for example, "why is solar energy not utilized on a large scale ?" (Class VIII, page 235, Question No.5). There are also a few questions which emphasise the value 'quest for knowledge'. For example "Name five liquids that you can find in your home" (Class VI, page 27, Question No.3). Similarly, some countable questions also emphasise the value 'creativity'. For example "Can you think of some unusual uses of glass fibres ?" (Class VIII, page 124). There is scope for improvement in formulating the questions. Instead of promoting rote memory, the questions should promote further learning, observation and creativity.

Figures

Some of the figures in the textbooks are drawn poor, are unclear and do not create interest in the students or serve the purpose of illustration. For example Fig 93 'Glass blowing' (Class VIII, page 121) is not clear. This aspect certainly requires improvement.

Boxes

The boxes in the textbooks provide additional and interesting information. The students are asked to study the information and understand the principles which can help them tackle several problems easily (Preface, class VII). However, the concepts given in some of the boxes are not easy for students to understand. For example, the concept given in the Box (Page 2, Class VII) on 'rocks flowing like tar' is not simple for students to understand. Further, 'how continents have drifted apart' is not an easy concept to be given in one line. It requires much for the teacher to explain. Then perhaps students may be interested to know further or find the information beneficial.

Conclusions

On the basis of the above discussion the following conclusions could be drawn :

- The science textbooks prepared by NCERT for the upper primary stage reflect the values expected to be represented in the textbooks according to the National Curriculum for Elementary and Secondary Education – A Framework (1988). These values include : curiosity, creativity, quest for knowledge, objectivity, honesty and truthfulness, courage to question, systematic reasoning, verification, open-mindedness, precision, spirit of team work, appreciation, equality of sexes, observance of small family norm, protection of environment, and perseverance.
- The emphasis on different values varies and it depends upon the nature of the content and topic.
- Three values including appreciation, curiosity, and systematic reasoning get highly emphasized in the textbooks as the contents provided the scope for emphasizing these values and it was utilized also.
- There is scope for more emphasis on values like honesty and truthfulness, objectivity, verification, courage to question, perseverance, and protection of environment, in the existing textbooks. However, there is not much scope for the value of creativity and spirit of team work.
- The scope for increase in emphasis on the values like observance of small family norm and protection of environment lies in the particular content area relevant to overpopulation and environment related problems respectively. The present textbooks do emphasise protection of environment but have no further scope for emphasizing the value observance of small family norm.
- There is also potential in the textbooks for including some more values such as cultural heritage, social responsibility, unity in diversity, national identity and pride, cleanliness and compassion etc which at present could be found to a little extent.
- Value emphasis depends upon the nature of the content is also revealed in the chapters with either high or low value emphasis. The chapters having biology

orientation or general orientation have high value emphasis while the chapters with physics or chemistry orientation have low value emphasis.

- The science is gender neutral and this nature of science is reflected in the textbooks.
- There is more emphasis in the textbooks on knowledge than on processes of science. Therefore, the values related to processes of science receive less weightage.
- The present textbooks give very little importance to interaction of science and technology and their interrelationship with society which is also one of the aims of science at upper primary stage as envisaged in the curriculum.

Suggestions:

The analysis of the science textbooks suggests that in order to improve upon the value emphasis in the textbooks, the following points need to be considered by textbook writers:

1. All the topics and chapters should be used for emphasizing values. It would be better if the values represented in each chapter are listed in the beginning or at the end of each chapter.
2. The textbooks should lay more stress on processes of science for development of values among students. The NCFSE (2000) also stresses the same for developing attitudes and values that constitute the spirit of scientific temper.
3. The activities should be well defined and planned. The activities which could be done by the students at home without requiring necessary laboratory facilities should be included to encourage the spirit of inquiry.
4. Interest plays a major role in any area of learning. The text should create and sustain interest for learning science through day-to-day experiences, development of hobbies, experimentation, and making simple science equipments etc.
5. The content should be organized in such a way so as to provide frequent opportunity for students to plan and work in groups.
6. The questions asked at the end of each section of a chapter and at the end of each chapter should not only be knowledge based or answered immediately or directly

in the text. The questions which arouse student interest and require them to apply learning from the text to the new situations should be given.

7. The questions should also be framed asking student the influence of a chapter on his/her daily life, and his/her way of observing or doing various activities in life.
8. The additional values including cultural heritage, unity in diversity, social responsibility, national identity and pride, compassion, and cleanliness which have been found in the textbooks should be increasingly emphasized.
9. The content should also appropriately give more coverage to indigenous technology, scientific things, and thinking from ancient times in India. NCFSE (2000) also states that :

   > "It is also necessary to familiarize children with Indian traditions of scientific and technological learning and contributions of Indian scientists both in past and present. The achievements of India in various fields through scientific and technological enterprises would develop and nurture self-confidence and self-assurance among learners." (p.59)

10. Value development is a process. The values cannot develop by introducing value inputs at one stage. The values related to science would become part of the student behaviour only if the contents of the science textbooks of upper primary stage and beyond continue to emphasise and reinforce these values.
11. The representation of values in the textbooks does not ensure that the students will imbibe those values on their own and find their relevance to life. According to Kumar (1989) transmission of values to the students depends upon the conditions and the manner in which the texts are presented. More important even than these is the teacher's role, his/her style of teaching and self-example by the teacher. The observation made in NCERT's (1999) report on value orientation is also quite pertinent in this context:

    > "The inculcation of scientific temper and spirit of inquiry educationally is more a question of attitude than that of any particular content or topic; they can be imparted mainly by taking pupils through actual investigations, systematic inquiry and exploratory learning activities"

Therefore, it is suggested that handbook for teachers should be prepared in order to help them to do the job of value inculcation effectively. Teachers' handbook should also provide chapter-wise list of values and how they can emphasise those values.

Finally, it can be said that if the purpose is to promote values through science textbooks, then this report may help serve the purpose to some extent. However, many more studies of this nature are required to be taken on textbooks prepared by different agencies in order to have a research base for emphasizing values in textbooks in an effective manner. As the textbooks used in this study will be revised and replaced by new additions in due course, the analysis will become obsolete. Perhaps the 'framework' developed for analysis of textbooks science textbooks with respect to value emphasis for the study either as it is or modified in some way may be found helpful by those interested in analysising the science textbooks or for writing of future textbooks with emphasis on values.

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Appendices

Appendix – I

Value Framework for Analysis of Science Textbooks

The focus of the present study is on 'values' emphasized in the science textbooks. For this purpose the values intended to be emphasized in the textbooks for grades 6 to 8 have been operationally defined. These values include 10 values mentioned at the page 'Science Related Values' in upper primary science textbooks prepared by NCERT before beginning the content, and some more values identified from National Curriculum Framework (1988). Most of these values are infact long range goals the foundations for which begin down in the elementary level. The experiences on successive levels may serve to enlarge and enhance the meaning and understanding of these values. At the elementary stage, the development of these values is through understanding and awareness of those aspects which are basic to development of these values. For example, a student can come to appreciate man as a living organism and his place in nature as he develops understanding of variety of life and of similarities among living things. The following framework operationalising the values will be used to analyse the science textbooks.

1. Curiosity

Curiosity is the individual's desire to know 'how and why' of what happens or exists in nature and in the environment. It is also seeking the explanation of the phenomenon. Curiosity is responsible for urge to explore through observations, activities, and experiments in order to satisfy the desire. The following learning experiences in science textbooks are helpful in developing Curiosity in students:

- Before the beginning of any topic, the desire to know is established by arousing certain amount of interest. For example, a question 'why is stone a solid, water is liquid, and air a gas?' in the beginning para of learning about 'States of Matter' (page 1, class VII) raises curiosity among students.

- Some 'Activities' given in the text are also suitable for inculcating this value. Activity that arouses curiosity is the one, which asks a question and requires the student to find the answer. For example, in Activity 13 on movement of ants in a line (page 145, class VII) the students are asked 'If you see a line of ants moving, wipe out a small portion of the line and then see what happens? Do they form the line again?'

2. Creativity

In a problem-solving process, a series of activities procede the final act of solving the problem The Children at elementary stage cannot solve all the problems but they can be helped to 'recognise' a problem which can be solved. In order to solve a genuine problem, creativity must be employed. Thus, any noval idea or personal discovery to solve the problem is creative. Potential situations in the text capable of developing skills and abilities associated with involving thinking and employing tactics to solve may be considered as emphasising development of creativity. Some of the examples from the text are given below:

- After explaining the device 'lever of the first type' it is stated 'Draw a diagram of any lever of the first type and mark the position of fulcrum, effort and load on it'. (page 87, class VI)
- The students are provided knowledge about glass fibres as one of the man-made material. Then under the heading 'Answer these' a question is asked 'Can you think of some unusual uses of glass fibres'? (page 124, Class VIII)
- Activity 5 (page 11, class VI). It is stated 'classify the non-living objects listed in Activity 4 in two or more groups any way you like'.

3. Quest for Knowledge

Quest for knowledge means anything which inspires the students to know or explore further. Inculcation of this value is a long term goal of science education. It is emphasized through creating interest in students for further exploration of knowledge by experimentation, observation or through literature about scientists and their innovations. The value can be developed by providing additional information related to natural phenomena which in turn inspires for further exploration. Some of the examples from the text are given below:

- Humphrey Dary and his invention of Davey's Safety Lamp for the safety of miners. (Page 12, box, Class VIII).
- In the context of knowledge of solids that flow (page 2, box, Class VII), it is stated "That solids can also exhibit a flow has interested consequences, Mountains exert considerable pressure on the rocks below them and make them flow like tar in the tar heap. The continents on earth are now known to move slowly. Some scientists have proposed that all the continents were together several million years ago. They have drifted apart slowly over these million of years. You may like to take a map of the world and see how the continents fit together. The fossil records found in the mountains lend support to this idea".
- Variety of movements in bee dance (page 145 box Class, VII). "Do you know bees inform others where food is available?"

> "The worker bee, after locating the food source, comes back to the beehive and performs a particular type of dance. People have found out that the movements during the dance convey the direction and place. If the source is near the hive, a "round dance" is performed. A "tail-wagging" dance says that the food source is more that 80 metres away. The distance is conveyed by the number of times this dance cycle is performed in a particular time. Slow dance means food is far away. The direction is also communicated through different movements in the dance. This variety of movements in the bee dance is an important method of communication in the bee society".

4. Objectivity

Objectivity refers to any information or knowledge in science must be viewed without any bias. It should be based on empirical evidences rather then personal likes or dislikes. The activities and experiments are also done in science carefully and systematically in an unbiased manner to know the truth. However, the scientific knowledge as a whole must reflect objectivity. Therefore, in the analysis, it is noted wherever in the content, the students are asked to 'Observe carefully' 'Repeat the activity as demonstrated' or the emphasis is on logic and reason without bias. etc. Some of the suitable examples from the text are given below:

- 'Is science Good or Bad?' (page 6, Class VI). Under this heading alongwith positive contributions of science, some disadvantages are also highlighted – "At the same time, however, some waste materials like smoke and some chemicals are produced. Some of these make air and water impure. They harm plants, people and animals."

- 'Answer These' (page 119-120, Class VIII). Question No.3 – "Compare the advantages and disadvantages of granite and marble as building materials".

- Under the heading 'Pesticides' (page 131, Class VIII) it is stated "Pesticides have helped increase food production, but their continued use in large quantities also leads to other problems"

5. Honesty and Truthfulness

Honesty and truthfulness is fundamental to science. So it is pre-requisite for all scientific activities and experimentation. Honesty and Truthfulness refers to presentation of scientific informations and experimental results truthfully and honestly without any distortion. For example:

- Activity 3 (page 128, Class VII)_ - "Watch and note down how the following organisms get their food : (i) ant, (ii) crow, (iii) wall lizard".

- Activity 4 (page 128, Class VII) - "List all animals you see around and classify them as herbivores and carnivores. Also record how they procure their food. List at least five animals which are omnivores".

The students are expected to observe, record, list and report all the information in above mentioned activities honestly and truthfully.

6. Courage to Question

Through the study of science, students learn that nothing happens in nature without any reason and there should be a logical answer, proof or convincing evidence to support the existing beliefs and practices. This learning develops in them the courage to question their beliefs, habits and attitudes and look for scientific answers/explanations. Given below are some of the examples from contents of the textbooks:

- Sometimes elimination of superstitions through evidence are directly emphasized. In the chapter entitled 'Magnetism' under the heading 'Wonderous Material' (box, page 54, Class VIII), it is mentioned how the study of 'magnet' disapproved many of the superstitions associated with magnetism, like, magnet had a life of its own, or it fed on iron filings etc.

- Sometimes while explaining a natural phenomena, logical answers are given with respect to prevalent beliefs which help the students to shun those beliefs e.g. While explaining that plants use oxygen in respiration (page 132, Class VII) during night and release CO_2 and use CO_2 in photosynthesis during day time and release O_2, the logical answer to the belief that 'it is not good to sleep under a tree at night' is given' – "It is the concentration of CO_2 which causes difficulty in respiration, but as the CO_2 gets mixed up with environment easily, and it may not prove harmful".

- In the chapter on Food (Class VII) under the heading 'Value of Some Everyday Food Items and Food Fads' (page, 170), the text provides information on relative nutrition value of some of the expensive and inexpensive food items, various food fads and how did such food fads start? It is also argued that the food fads are just superstitions and have no scientific basis.

7. Systematic Reasoning

The nature of scientific knowledge in itself is reason based including three basic elements – order, sequencing and developing pattern. In order to reach a conclusion, the students are required to follow certain steps. These steps include confrontation of the problem, understanding it on the basis of previous knowledge, collecting relevant information from all sources, analysing the collected information in the light of the problem, thinking tentative solutions, reaching out to best solution by considering each solution one by one, and later on applying the best solution to problems of similar nature. However, it is not necessary that all the aspects are referred everywhere in the content presentations. Given below are some of the examples from the text:

- 'How Does a Scientist Work?' (page 3, Class VI) : Under this heading the value of systematic reasoning is emphasized through example of bicycle – "Even when you notice some harsh sound made by you bicycle, you use a scientific method to detect the cause and repair the falt. First you try to find out which part, like the chain, pedal or wheels, is producing that sound. Then you check carefully and try to find the exact part that makes the sound. You observe the part keenly and decide why it is making that sound. You then decide what needs to be done. Accordingly, you readjust the part, oil it or decide to replace it".

- Sometimes reasoning is also emphasized through learning experiences or the situations which demand thinking on the part of students. For example, in order to show that 'solids expand on heating' an activity with ring and ball apparatus is given in the text (page 31, Activity 2 class VII). Before heating, ball passes through the ring and after heating it does not. Based on this the students are asked the question (page 32, Question No.2, Answer these) - "How will you remove the iron ball after it has dropped into the ring"?

8. Verification

In science, it is essential to check, re-test or verify the facts since the scientific knowledge is universal. The students are also expected to learn to verify the facts through activities and experimentation before accepting. Following are some of the examples from the textbook contents emphasizing the value of verification.

- Under the heading 'Pressure Exerted by Liquids' (page 42, Class VIII), in the second para it is stated------"Let us study the pressure exerted by a liquid. To do this, we make a simple device (a meter) which can give an indication of the magnitude of pressure". Following this, 'Activity 3' includes all the steps to make a simple pressure-meter and shows that the level of water in the tube rises with the pressure in these words-------" Notice that the level of water in the tube rises when you exert more pressure on the membrane. The level of water in the tube, therefore, gives an indication of the magnitude of the pressure exerted".

- Question No. 10 under the heading 'Now Answer These' (page 115, class VIII) "How will you show that copper is more reactive than silver?"

9. Open-mindedness

Open-mindedness means willingness to consider new facts, others' views, reasons and logic. The science education is expected to make students open-minded towards work and opinions of others and information related to their problems. The following behaviours indicate open-mindedness:

- The student accepts no conclusion or result as final or ultimate
- He revises his opinions and conclusions, admits his mistakes in the light of facts/evidence.

- He listens to observe or reads evidence supporting ideas contrary to his views.

The following content, for example, emphasizes the value of open-mindedness as defined above:

- "How Does a Scientist Work?" (page 3, Class VII) Under this heading, the sentence "If he (scientist) finds his thinking incorrect, he tries to find out the mistakes and readily corrects himself," emphasises open-mindedness.
- In chapter on 'Organic Evolution' (Class VIII), is described the fossil finds of dinosaurs in box (page 198). The description includes physical characteristics and habits etc. of dinosaurs and how they became extinct. The mention ends up with the line "However, there may be many other probable reasons for their extinction".

10. Precision

Precision means accuracy and briefness. It is emphasized in science as estimation, approximation, accuracy and precision. The students are expected to:

- make precise questions related to observations and exploration,
- Conclude briefly after experimentation/observation,
- know the importance of actual and accurate measurement, and
- deal with quantitative measurements, collection, presentation (including mathematical and geographical form) and analysis of data and draw inferences in an accurate manner.

Following are some of the examples from the textbook contents which emphasise this value:

- In chapter on 'Measurements' (Class VI), precision is emphasized through mentioning proper use of devices for measurements of length and precautions to be taken in using devices for measurements, such as "The scale should be placed along the length to be measured', "Scale's ends should not be broken" "Your eye must be exactly above the point where the measurement is to be taken as shown in Fig. 4.8 from position A. Note that from position A the reading is 1.0 cm. From position B and C, the readings are 0.9 cm and 1.1 cm, respectively. The readings from B and C are not correct." (page 46)

- Sometimes the value is emphasized directly through the statements, for example, "Without actual measurements you cannot make correct judgements", "You must insist on correct measures". "A correct metre scale has signs (↔) on both ends in additions to the stamp of Weights and Measurement Department" (page 47 Class, VI)

11. Spirit of Team Work

Team work involves mutual dependence and working with others. It may be developed in students through providing opportunities to work in groups such as conducting experiments with the help of others, taking observations and comparing with others' observations, collecting information and compiling, analyzing together to reach at conclusion, making joint projects or sharing knowledge of their experiments with others etc. Following are some of the examples from content areas which emphasise team spirit:

- 'Activity 5' (page 131, Class VII) requires the students to count his breathing rate per minute at rest and after doing a 20 sit-up exercise and then compare the result with his friends.

- 'Activity 4' on Movement of molecules (page 3, class VII). The student is asked to light a candle in one corner of his classroom and then stand in some other corner and ask a friend to light a few agarbattis using the candle flame. The student is asked to note the time between lighting agarbattis and his smelling the fragrance.

12. Appreciation

Appreciation is positively value laden perception of beauty of nature, knowledge of science, scientific processes and products of science. Some of the areas through which development of appreciation takes place are:

- Contributions of science/scientists to the progress of civilization.
- Impact of science on daily life and its implications for the future of mankind.
- The importance of conserving natural resources of many types.
- Man's and other organisms' place on the earth and interdependence of animals, plants; wonders of nature and their importance in daily life.
- Variety of structure of different living organisms for different life processes.

With respect to these areas, given below are some of the examples from the textbook contents emphasizing development of appreciation:

- 'Humphrey Davy' and his investigation of Davy's Safety Lamp for safety of miners (page 12, class VIII)
- Mention about Vitamins and their importance for health (page 174, class VII) - The lack of proper kinds and amount of vitamins leads to vitamin deficiency diseases.
- 'Contamination of Water' - Sources of water contamination, harmful effects of contaminated water and methods of making water safe from bacteria (page 170, class VII).
- Figure 14.7 "Plants and animals depend on each other for their survival" (page, 132, Class VII) and its description (box, page 133) shows that the O_2 released by the plants during photosynthesis is used by the insect for its respiration while the CO_2 released by the insect during its respiration is used by the plant for its photosynthesis.

13. Equality of Sexes

Science as a body of knowledge is gender neutral as all the facts, activities, applications of science to life etc. .are universal. However, inequality in science may occur due to scientific or physiological reasons but not due to cultural bias. For example:

- In chapter on 'Food' (Class VII), after giving the students understanding of food and balanced diet, its elements and balanced diet of 12 year old child, questions are raised ('Answer these' page 170) "How many calories does a 12 year old boy or girl need each day?" "How can this boy or girl get this in the diet?" These questions emphasise the requirement of balanced diet to both the sexes equally and thus emphasise the value of equality of sexes.

14. Observance of Small Family Norm

This was identified as one of the core elements of National Policy of Education, 1986, reiterated again in School Curriculum 2000 document. In view of the consequences of over population and large families, one may appreciate the need for limiting the population and family size for distribution of resources. The following content areas, for example, emphasise this value:

- ❖ It is mentioned in chapter on 'Food' (page 171, class VII) that country's food problem is becoming greater every year due to an increase in over population. As one of the measures to solve this problem, it is mentioned that we should do our best to see that population of the country does not increase.
- ❖ Further on page 173 it is emphasized – How growth in population (i.e. over population) is affecting forests, land and disturbs nature as more food, resources and houses are required.

15. Protection of Environment

Protection of environment means concern for natural resources, environment and other creatures, and misuse and contamination of resources.

The value of protection of environment could be developed in students by laying emphasis on concern for maintenance and improvement of environment through the following learning experiences:

- ➢ Drawing attention towards depletion of natural resources (air, water, soil, wild life etc.), misuse and contamination of resources.
- ➢ Importance of these resources to mankind and need to protect them and improve the environment.
- ➢ Awareness of measures for improvement.

This concern will help the students to protect these resources and improve the quality of life and quality of environment. It is also mentioned as fundamental duties of citizens (as per Article 51 A (g). Given below are some examples from the text emphasizing this value:

- ❖ In chapter on 'Balance in Nature' (Class VI) sensitivity to environment is created through making students understand "How human beings disturbs nature by destroying forests and through other human activities?" (page 171).
- ❖ In chapter on 'Soil' (Class VII) importance of soil, problem of soil erosion and conservation of soil through adopting different methods is discussed (page 191-192).

- Chapter entitled 'Conservation of Natural Resources' (class VIII) lays emphasis on concern for depletion of various resources and various conservation measures.

16. Perseverance

Perseverance means the act or state of persevering i.e. continued application of act or treatment – a going on till the success is met with. It includes motivation, patience, dedication and commitment for the work. This is true of the scientists' behaviour. A scientist takes number of years of concerted effort to achieve some results. The value 'perserverance' could be emphasized through providing knowledge about this aspect of scientists' behaviour. Some of the suitable examples from the text are given below:

- In chapter 5 on 'Magnetism' (Class VIII) under the title 'Wonderous Material' (Page 54) it is mentioned that William Gilbert of England was the first person to carefully study and record the properties of magnet. It took him 17 years and at the end he published a book titled 'the magnet'
- Under the title "Humphrey Davy" (Box, page 12, Class VIII) the dedicated work of a scientist Humphrey Davy is mentioned who invented Davy's lamp for the safety of minors.

Appendix-II

Chapter-wise Analysis of Textbooks

Class-VI------------------ P.60
Class-VII---------------- P.119
Class-VIII-------------- P.191

Appendix-II

Class-VI

Chapter :One
Title- Science in Everyday Life

Page	Section	Para	Content	Value	Remarks
1		1	-Have you ever----------------childhood ?	-Curiosity	
			-Everything has-------------entertainment	-Appreciation (of products of Science)	-Relationship of the things mentioned with science and technology and social change is required to be mentioned. -New technology words like computer, fax and multimedia devices could also be added to the list of things mentioned.
			-Do you know-------------------about	-Curiosity	
			-It is through---------------------devices	Appreciation(of Scientific Processes)	-In this sentence word 'technology' may be used.
			-Through hard work -problems	-Perseverence	-Hard work
	1.1		**-(Science Helps)**	-Systematic Reasoning	-It is systematic approach here.

		2	-Do you know-------------------messages?	-Systematic Reasoning	-Prior to this question, some explanations are needed -Teachers should be trained to understand the expectations from the question
3		3	-The newspapers-------------away place	Appreciation (Products of Science & Technology)	-Examples of modern technology could be included
		4	-Till recently---------------------diseases	-Appreciation (of Scientific inventions/products)	
		5 Fig.1.2	-All these developments-----------------------elders	-Appreciation -Quest for knowledge	
		6	**-(Answer These)** Question No.1-----	Systematic Reasoning	
			Question No.2------	-do-	-Number and title on the table may be given.
	1.2		**-(How does a Scientist Work?)**		
		7	-Scientific methods-----------------fault	-Appreciation (Scientific methods)	
			-First you try-------------------replace it (including Fig 1.3 (Page.4)	-Systematic Reasoning	

3-4		8	-A Scientist works-----------conclusions	-do-	-Students could be motivated to explore themselves in the light of the work of the scientist
			-If he finds------------------------himself	-Open mindedness	
4		9	-Remember-------------------evidence	-Objectivity	
4-5-6		10	-Fig.1.4 and Points (i) to (viii)	-Systematic Reasoning	
		11	**-(Answer These)** -Question No.1-----	-Systematic Reasoning -Honesty and Truthfulness	
			-Question No.3------	-Systematic Reasoning	
6	**1.3**		**-(Is Science Good or Bad?)**		
		12	-Aryabhata was a----------------country	Cultural heritage (Indigenisation) -Appreciation (Innovations)	-Concern of National School Curriculum 2000
6-7		13	-A scientist named---------------industries	-Appreciation (inventions)	
			-A Scientist named---------------diseases	-Perseverence	-Scientists work very hard
			-You must have-------------polonium	-do-	
7		14	-Science has helped-----------many diseases	-Appreciation (inventions)	

			-At the same time------------------------animals	-Objectivity	-Realisation of adverse impact of Scientific inventions
			-Answer to----------------------------applications	-Quest for knowledge	
		15			
			-Sometimes Science, too------------avoided	-Objectivity	
			-The existence of-----------------danger	-Protection of Environment	
		16			
			-**(Answer these)**		
			-Question No.2------	-Objectivity	-Students learn to judge in an unbiased way
		17			
			-**(You Now Know)**- -Science helps-------------------thinking	-Precision -Appreciation (contributions of science)	
			-Reading, listening------------------knowledge	-Quest for knowledge	
			-Science should be---------------------------them	-Protection of Environment	
		18			
			-**(Now Answer These)**		
			-Question No.3-----	-Systematic Reasoning -Quest for knowledge	

Chapter: Two
Title: Things Around Us

Page	Section	Para	Content	Value	Remarks
9		2	-What are these objects---------------liquids and gases ?	-Curiosity.	-Too many questions (Six) in one paragraph are given -The last two questions on particles and their arrangement in solids, liquids and gases require much to be explained by teacher to fill the gap. Otherwise the students may get confused.
10	**2.1**		**-(Classifying Things)**		
		3	-How are they different ?--------------------they are alike ?	-Curiosity	
				-Systematic Reasoning	-The students are required to observe think and solve the problems
		4	**(Activity 1)**		
			-Collect and list-----------------------------the sun and stars.	-Quest for knowledge	-Opportunity to explore further on their own is provided.
			-Are they all-----------------------------shape and colour ?	-Systematic Reasoning	-The question involves reasoning.
		6	-Thus grouping the objects---------------to work with them	-Appreciation (of methods)	

		7	-How are the objects---------- -------------does it help ?	-Curiosity	
			-In what other places---------- -------------four examples	-Quest for knowledge	-Students are acquired to observe keenly to find out the answer
		8	-In what other ways----------- ----------group objects ?	-Systematic Reasoning	
			(Activity 3)		
10		9	-Can you classify them if not, why ? (including Fig.2.2 (a)	-Curiosity -Systematic Reasoning	
10-11		10-11	-See Fig.2.2d (b) and classifying and some dissimilarities.	-Systematic Reasoning	
			-Thus you can----------------- -------------dissimilarities	-Precision	
11			**(Activity 4)**		
		13	-Some objects are------------- ----------------tabular form	-Systematic Reasoning	
		14	-Now try to classify----------- ---------same or different ?	-Systematic Reasoning	
			-Compare your groups-------- -------------your classmates	-Team spirit/work	-This activity does not provide students an opportunity to work together but to compare the outcome of their work.

		15	-Classify the animals---------- ---------of your classmates.	-Team Spirit	
		16	**(Activity 5)**		
			-Classify the non-living------- --------------------you like	-Creativity	-Students are likely to do things in different way.
			-Compare your groupings---- -----------------classmates	-Team spirit	-This small activity emphasizes three values
			-Are the groupings the-------- ----------------------same ?	-Systematic Reasoning	
12		19	**(Activity 6)**		
			-List at least------------------- --------------------materials	-Systematic Reasoning -Quest for knowledge	-Students have to find information on their own.
		20	-List in Table 2.1------------- ---------------------table	-Systematic Reasoning -Quest for knowledge	-do-
		21	-List in Table 2.2------------- -----------------------table	-Systematic Reasoning -Quest for knowledge	-do-
		22	-List in Table 2.3------------- ----------------------table	-Systematic Reasoning -Quest for knowledge	-do-

		23	-Thus, you find------------------ ------------------materials	-Systematic Reasoning -Precision	
14		24	**-(Answer these)**		
			-Question No.1----------	-Systematic Reasoning	
			-Question No.2-------------	-do-	
			-Question No.3---------------	-do-	
	2.2		**-(What is Matter)**		
		26	**-(Activity 7)**		
			-Which one is------------------ --------------------tumbler	-Systematic Reasoning	-The activities 7 & 8 do not link up with the heading of the section and description given there. The activities should have started with 'All matter has mass' or 'let us see if the matter has mass.'
		27	**-(Activity 8)**		
			-Is the beam-------------------- ------------------------mass	-Systematic Reasoning	
			-Thus you find----------------- ------------------------mass	-Precision	
15		28	-Does it occupy space ?	-Systematic Reasoning	

		30	-It means that------------------ -----------------------tumbler	-Systematic Reasoning	-These activities start abruptly and leave much for the teacher to explain or fill the gap.
		32	-That is, matter---------------- -----------------------space	-Precision	
		37	-Where do these-------------- -----------------------from ?	-Curiosity	
		38	-Have you ever---------------- ---------------------water ?	-Curiosity	-However, curiosity is killed with immediate answer provided in the text.
		41	-Can you give----------------- ---------------------another	-Curiosity -Quest for knowledge	
		42	**-(Answer These)**		
			-Question No.2-------------	-Systematic Reasoning	
			-Question No.3---------------	-do-	
	2.3		**-(Classification of Materials)**		
		44	-Classify them----------------- -------------------------form	-do-	
		45	**-(Activity-11)**		
		46	-These materials are---------- ---------insoluble in water	-Systematic Reasoning	

			-Identify the--material	-Honesty and Truthfulness -Systematic Reasoning	
			-List some more--------------------------------------in water	-Quest for knowledge	
		52	-Can you give--------------------------------------objects	-Curiosity -Quest for knowledge	
18-19		53	**-(Answer These)**		
			-Question No.1------------	-Quest for knowledge	
			-Question No.2--------------	-Systematic Reasoning	
19	2.4		**-(Elements and Compounds)**		
		54	-How is this---------------------------------------made of ?	-Curiosity	
		56	-Similarly a large--------------------------(building block)	-Systematic Reasoning	
20		61	-The elements found----------------------------oxygen	-Appreciation (of knowledge)	
		62	-Each element has------------------------------------elements	-do-	
21		65	**-(Activity 14)**		

			-Some commonly used------- --------------teacher/friend	-Quest for knowledge	
		68	-What do you observe ?	-Curiosity	-Immediate and direct answer is not provided in the text. Either the students learn by doing or the teacher explains.
		71	-Do you now------------------ ----------------------powder	-Curiosity	-The following para (No.72) provides direct answers to both the questions. So the value of Questions is almost finished.
			-Can you separate------------ --------------------magnet ?	-Systematic Reasoning	
			-Write your observations in Table 2.5	-Honesty and Truthfulness	
22		75	-**(Activity 16)**		
			-Some commonly used ------- ----------------------them	-Quest for knowledge	
		76	-**(Answer these)**		
			-Question No.5------------	-Systematic Reasoning	
	2.5		-**(Atoms and Molecules)**		

23		79	-Do you------------------------ ---------------------particles	-Curiosity	
		80	-It means that------------------- ---------------------kind	-Systematic Reasoning	
24		87	-Now can you-------------- --------------------------are ?	-Curiosity	
		88 box	-You will----------------atoms	-Appreciation (of knowledge)	
			-One tea spoon full------------ ----------------------water	-do-	
	2.6		**-(Solide, Liquid and Gas)**		
		90	-Why does this------------------ ---------------------occur ?	-Systematic Reasoning	
25		94	-Thus, you will------------------ -----------------------change	-Precision	
26		98	**-(Answer these)**		
			-Question No.3-------------	-Systematic Reasoning	
26-27		99	**-(You Now Know)** -Grouping-------- completely	Precision	
			-(Now Answer These)		
27		100	-Question No.1-------------	-Systematic Reasoning	
			-Question No.2----------------	-Systematic Reasoning)	
			-Question No.3--------------	-Quest for knowledge	
			-Question No.5---------------	-Systematic Reasoning	
			-Question No.6-----------------	-do-	

Chapter: Three
Title: Separation of substances

Page	Section	Para	Content	Value	Remarks
29		2	-What is a ---------------mixture?	-Curiosity	
	3.1		-**(What is a Mixture)**		
30		7	-It can be-----------------mixture	-Objectivity	'Evidence can be given' is emphasized.
		9	-In What respect-----------water	-Systematic Reasoning	
31		20	-**(Answer These)**		
			-Question No.4---------------	-do-	
			-Question No.5-----------------	-do-	
	3.2		-**(Methods of Separation)**		
		21	-Therefore, when------------------- ----------------------components	-do-	
33		29	-This behaviour-------------------- ------------------------mixture	-Appreciation (of knowledge)	
			-In industry------------------------- --------------------crane (Fig. 3.7)	-do-	-Utility of knowledge in industries
34		31	-The process of------------oil	-Appreciation (of Processes)	
		32	-This method----------------------- ----------------------------miscible	-Objectivity	
		35	-Which component---------------- ------------------------------layer?	-Systematic Reasoning	
35		37	-To make -------------is used	-Appreciation (of method of science)	
36		41	-The process of-----------milk	-Appreciation (of method & process)	

		43	-Can you filter---tea strainer ?	-Systematic Reasoning	
		44	-How will you-----------in water	-Curiosity	
37		46	-In fact, this process---------salt	-Appreciation (of methods science)	
39		55	-Have you ever--obtained?	-Curiosity	
40	3.3		**-(Separation of a Pure Material-----------------methods)**		
		60	-From these activities---methods	-Systematic Reasoning	
41		61	**-(Answer these)**		
			-Question No.1-----------------	-Systematic Reasoning	
			-Question No.4---------------	-do-	
41-42		62	**-(You Now Know)** -A pure-----------------mixture	 -Precision	
44		63	**-(Now Answer These)**		
			-Question No.2--------------------	-Systematic Reasoning	
			-Question No.3--------------------	-do-	
			-Question No.5--------------------	-do-	
			-Question No.6--------------------	-do-	
			-Question No.7--------------------	-do-	

Chapter: Four
Title : Measurement

Page	Section	Para	Content	Value	Remarks
43		1	-Measurement is--at them	-Appreciation (of processes of science)	
			-Actual measurement--------------------------------dependable	-do-	
		Fig.4.1	-What is wrong---------------------------------------measurements?	-Curiosity	
		2	-Look at the two lines---------------------------------------longer ?	-Curiosity	
44		3	-Look at the two flowers-----------------------------------bigger ?	-do-	
		4	-Look at the two measuring------------------------------------water ?	-do-	
44	4.1		**-(Need of Standard Units)**		
44-45		7	-Ask three of your --lengths	-Spirit of Team work	
			-Are they equal ?---as a unit	-Systematic Reasoning	
45		8	-Hence, in buying--is used	-Appreciation (of knowledge)	
		9	-Table 4.1 gives--time	-Precision	
	4.2		**-(Measurement of Length)**		

		10	-Do you know--------------------- --------------------------metre is ?	-Curiosity	
46		15	-What does a tailor---------------- ------------------------------chest?	-do-	
		16	-It these precautions-------------- -------------------------not correct	-Precision	-Importance of actual and accurate measurements is emphasised
47		17	-A correct metre------------------- ----------------------Department	-do-	
			-You must insist------------------- -----------------------------or not	-do- Responsibility	
		18	-Can you measure------------------ -------------------------scale ?	-Curiosity	
47-48		19	-If you want to--------------------- --------------------playing card	-Systematic Reasoning	
48		21	-Try to estimate------------------- ---------------------------practising	-Honesty and Truthfulness	
49		22	**-(Answer these)**		
			-Question No.1-------------------	-Systematic Reasoning	
			-Question No.5-------------------	-Precision	
	4.3		**-(Measurement of Area)**		
		27	-These cannot be------------------ ----------------------correctly	Objectivity	
50		28	-Suppose you want----------------- --------------------------- slipper	-Systematic Reasoning	
		29	-Estimate the area----------------- ----------------------measurement	-Verification	

		30	**-(Answer these)**		
			-Question No.2---------------------	-Systematic Reasoning	
			-Question No.3-------------------	-do-	
	4.4		**-(Measurement of Volume)**		
		31	-Can you tell---------------katori	-do	
			-(Activity-2)		
51		38	-Find out the--measurement	-Honesty and Truthfulness	
		40	-It can therefore---or oil	-Appreciation (of products)	
53		48	-In this way--in it	-Appreciation (of method)	
			-Can you suggest---cork?	-Quest for knowledge	
53-54		49	**-(Answer these)**		
			-Question No.2------------------	-Systematic Reasoning	
			-Question No.4---------------------	-do-	
54	4.5		**-(Measurement of Mass)**		
56		56	-Which is heavier---much?	-do-	
		58	-But when costly items--------------------------------------accurately	-Precision	-Importance of actual and accurate measurements is emphasized.

56-57		59	-When you---under weighing	-Social Responsibility -Precision -Appreciation (of knowledge) -Objectivity	-Students are asked to buy accurately measured/weighed things and to be careful of tools used for measuring/ weighing
57		60	-You must also---correct	Responsibility (Social)	
			-You must also--under weighing	-Objectivity	
		61	-Go to the shops--weights	-Quest for knowledge	
		62	**-(Answer these)**		
			-Question No.1-------------------	-Systematic Reasoning	
	4.6		**-(Measurement of Temperature)**		
58		67	-It cannot therefore---42°c	-Objectivity	
59		68	-In order to measure--------------------------------designed	-Appreciation (of products)	
		71	**-(Activity-6)**		
			-Take it out---thermometer	-Honesty and Truthfulness	
	4.7		**-(Measurement of Time)**		

59-60		73	-Thus, knowledge of-------------- ----------------------important	-Appreciation (of knowledge)	
60		75	-A process such------------------- ----------------------------interval	Appreciation (of process)	
			-This principle of------------------ ----------------------(Fig.4.23)	-Appreciation (of knowledge)	
61		78	-To measure the time------------- --------------------------at will	-Appreciation (of products)	
61-62		79	-(Activity-7)		
			-Estimate the time--------------	-Honesty and Truthfulness	
			-If your estimates----------------- ---------------------------practice		-One can improve upon through practice
62		80	**-(Activity-8)**		
			-Remove the finger--------------- -------------------------drain off	-Honesty and Truthfulness	
62-63		82	**-(You Now Know)**		
			- Your senses----------internal	-Precision	
		83	**-(Now Answer These)**		
			-Question No.1------------------	-Systematic Reasoning	
			-Question No.6----------------	-Precision	

Chapter: Five
Title: Changes Around Us

Page	Section	Para	Content	Value	Remarks
65	5.1		**-(Classification of Things)**		
		2	-Can you think of---------------- ----- ----------------changes?	-Creativity	-Students are required to think afresh
			-Have you ever------------------- ---------------------------another	-Curiosity	
		6	-Do you think------------------- ---------------------different ?	-Curiosity	
67		9	-Can you give------------------- ------------------------changes ?	-Systematic Reasoning	
		10	**-(Activity 1)**		
			-Classify the following---------- -------------------------------juice	-do-	
67-68		11	-But there are--------------------- -------------------------changes	-Objectivity	
		12	-You will realize----------------- ---------------------undesirable	-do-	
		13	-A change may be--------------- -------------------------------nature	-do-	
69		17	-Can you think----------------- -----------------------changes?	-Systematic Reasoning	
		18	-Therefore, such changes------- ---------------------------interval	-Appreciation (of knowledge)	
		21	-Can you think of--------------- -----------------------changes	-Systematic Reasoning	
70		23	-Can you give------------------- ------------------------changes ?	-do-	
		25	-When a sustance---------------- -----------------formed(Fig.5.7)	-Precision	-Brief conclusion after activity/ observation.

71		30	-Can you give------------------ ------------------------change ?	-Systematic Reasoning	
		31	-Do you know------------------- ---- --------------------how ?	-Curiosity	
		33	-List at least-------------------- - -----------------man-made	-Honesty and Truthfulness -Systematic Reasoning	
	5.2		**-(Changes Involve Interaction)**		
		36	-Have you ever------------------ ----------------------does so ?	-Curiosity	
72		40	-It means that-------------------- ----------------------interaction	-Precision	
	5.3	44	-What kind of------------------ -------------------------is this ?	-Curiosity	-However, curiosity is killed with immediate answer.
73		49	**-(You Now Know)** Changes-----------------other	-Precision	
73-74		50	**-(Now Answer These)**		
			-Question No.3------------------	-Systematic Reasoning	
			-Question No.4------------------	-do-	
			-Question No.13----------------	-do-	

Chapter:Six
Title : Motion,Force and Machines

Page	Section	Para	Content	Value	Remarks
75	6.1		-**(What is Motion)**		
76		4	-Just by looking------------ ------------------------or not	-Curiosity	
78		8	-**(Activity 1)**		
			-Observe its--------------- ------------------is this?	-Systematic Reasoning	
		10	-Why do they dance ?------	-Curiosity	
		12	-Which train---------------- ---------------------faster ?	-Systematic Reasoning	
		13	-To answer this question--- ------------------------train	-do-	
			-Here you have------------ ------------------------speed	-Precision	
79		16	-Cheetah is a--------------- --------------- -per minute	-Appreciation (of knowledge)	
		17	-Next time----------------- -------------- -------vehicle	-Quest for knowledge	
	6.2		-**(What is Force ?)**		
		18	-Look at Figs----------how	-Curiosity	
79-80		20	-Look at Fig.6.11----------- ------------------------pull	-do-	
80		21	-When a man---------------- ----------------- ----back ?	-Systematic Reasoning	
			-Thus,a force--------------- ----------------------object	-Precision	
		22	-**(Activity 2)**		

			-All these observations----- -------------------decreases	-do-	
		23	-Why did--------------------- ---------------------charge ?	-Curiosity	-Immediate answer follows. So no scope for students to find answer.
		24	-Thus, it can be------------- -----------------------object	-Precision	
81		25	-Force can thus-------------- -----------------------object	-do-	
82-83		27	-Many toys------------------ -----------------------them	-Appreciation (of knowledge)	
83		28	**-(Activity 4)**		
			-Do you observe------------- -------------------(Fig.6.20)	-Curiosity	-Answer is given in figure
		31	-Do you---------------------- ----------------------why ?	-Curiosity	-Immediate answer follows .
84		32	-What is--------------------- --------------------weight?	-Curiosity	
			-Take a light ----------------- --------------------the earth	-Systematic Reasoning	
			-The heavier the object----- -----------------------string	-Precision	
			-The grater the--------------- ----------------------weight	-do-	
		33	-How then did---------------- ------------- ---------stop?	-Curiosity	
			-If a ball is rolled------------ -------------------distance ?	-Systematic Reasoning	
84-85		34	**-(Activity 6)**		
			-Take a piece of------------- -------------------contact	-Systematic Reasoning	

			-Thus, the frictional-------- --------------------contact	-Precision	
85		35	-Friction may be----------- -------------------wear out	Objectivity	
86		36	-Without friction----------- ---------------------friction	-Appreciation (of knowledge)	
		37	-You have seen------------ ------------disadvantageous	-Objectivity	
			-To increase friction------- -----------------(Fig.6.26)	-Appreciation (of knowledge)	
			-To increase friction special-----------------used	-do-	
			-To increase friction, spikes------------(Fig.6.27)	-do-	
86-87		38	-To reduce friction--------- ----------------------grease	-do-	
			-This knowledge is--------- ------------------------parts	-do-	
87	6.3		-(**Machines**)		
		39	-Why are--------------------- ----------------------used ?	-Curiosity	
		43	-To lift or move------------ ----------------is easier?	-do-	
88		45	-Draw a diagram----------- -----------------------------it	-Creativity	
89		46	-This type of-------------- ------------------------job	-Appreciation (of knowledge)	
			-Draw a diagram----------- ------------------------on it	-Creativity	
		47	-Draw a diagram---------- ------------------------load	-do-	
		48	-Find out the-------------- -----------------belong to	-Curiosity -Quest for knowledge	

		49	-Look at Fig.6.35------------ ----------------------truck ?	-Curiosity	
90		50	-The wheel is one----------- --------------------- machines	-Appreciation (of invention)	
			-Which do you-------------- -----------------------box?	-Systematic Reasoning	
		52	-If a machine----------------- --------------------regularly	Appreciation (of knowledge)	
		53	-Machines need to----------- -----------------------service	-do-	
		54	**-(Answer these)**		
91			-Question No.4--------------	-Systematic Reasoning	
		55	**-(You Now Know)**		
			-When a body---------------- -------------maintenance	-Precision	
		56	**-(Now Answer these)**		
			-Question No.2--------------	-Systematic Reasoning	
			-Question No.3--------------	-do-	
			-Question No.5--------------	-do-	
			-Question No.6--------------	-do-	
			-Question No.9--------------	-do-	
			-Question No.7--------------	-Creativity	

Chapter : Seven
Title: The Living World

Page	Section	Para	Content	Value	Remarks
93		1	-There is a variety--------- -------------------identified	-Appreciation (of nature)	
			-How do they vary ?------	-Curiosity	
	7.1		**-(Variety in the Living World)**		
		2	**-(Activity-1)**		
		Fig. 7.14 & 7.2	-How many---------------- ---------------------these ?	-do- -Creativity	
			-Imagine what------------- ------------------------world	-Appreciation (beauty of nature)	
95		7 Fig.7.3	-Do you see anything ?--- ---------------observations	Honesty and Truthfulness	-Students are expected to note their observations honestly.
			-Look at Fig.7.3----------- ----------------microscope	-Curiosity	
95		9	-Which is the-------------- -------------------think of ?	-do-	
			-But do you know---------- elephants (including Fig.7.4,page, 96)	-Appreciation (beauty of nature)	
		10	-Do all the living forms-- ------------------------food ?	-Curiosity	-The curiosity dies as the question is immediately followed by 'No'. Instead there should be watch and note.
			-Think of some animals-- ------------------same food	-do-	
		11	**-(Activity 3)**		
			-What kind of------------- ------------------------snail	-Curiosity -Quest for knowledge	

		13	-What do------------------ ------------------protection	-Curiosity	
95-96		14	**-(Activity 4)**		
			-Where do----------------- -----------------------shark	-do- Quest for knowledge	
96		15	-Have you ever----------- --------------underground	-Curiosity -Quest for knowledge	
97		18	-Termites, ants------------ -----------------like light	-Systematic Reasoning	-The two sentences are required to be linked to establish causal relationship
			-What other--------------- -------------------think of	-do-	
			-Can you think ----------- ----------------like light ?	-do- -Quest for knowledge	
		19	**-(Activity 5)**		
			-Does it help------------- ---------------from light ?	-Curiosity	
		20	-Take a glass tube--------- --------------observations	-Systematic Reasoning Honesty and Truthfulness	-Analyses of the specific incidence and generalisation -Students are asked to note down observations
		21	-Can you name some more ?----------	-Curiosity -Quest for knowledge	
		24	-Can you think of-------- -------------------habitats	-Curiosity -Quest for knowledge	
99		25	**-(Activity 7)**		

			-If you cannot-------------------------------features	-Honesty and Truthfulness -Creativity	-Report as you see
		26	-What animals------------------------------the water?	-Systematic Reasoning	
100		31	-The scientific names----------------------------belongs	-Appreciation (of knowledge)	
		33	-Do you know-----------------------bird of India ?	-National Identity and Pride	-Use of Indigenous knowledge
		34 (box)	-There are over------------------------------A.D.2000	-Protection of Environment	-Concern for extinction of living species
		35	-But in spite of----------------------------all living	-Unity in diversity	-Most common thing in all things is emphasized.
101	7.2		**-(Living Organisms Have———characters)** **-(Activity 8)**		
102		43	-Draw the structure----------------------------you see	-Honesty and Truthfulness	
		44	-Make a drawing--------------------------------cells	-do-	
		46	-Do you know---------------(2,000,000,000 cells)	-Appreciation (beauty of nature)	
104	7.3		**-(Classification of Living Forms)**		
		48	-You have learnt-----------------------------animals	-Unity in diversity and diversity in unity	
100		49	**-(Activity 9)**		

			-What do------------------ ------------------common?	-Systematic Reasoning	
			-How do------------------- --------------one another?	-Systematic Reasoning	
			-What do------------------ --------------in common ?	-do-	
			-How do------------------- ---------from one another?	-do-	
			-What are the main------- -------------------animals?	-do-	
		58	-Now let us see----------- ---------------------further	-Curiosity	
104-105		59	**-(Do you know ?)**		
			-Some plants-------------- -------vol vox	-Appreciation (beauty of nature)	
			-Some animals------------- ---------------------corals	-do-	
			-Bacteria are-------------- -------------------plants	-do-	
			-Viruses are---------------- -non-living	-do-	
105		62	-How would you--------- ----------------plant it is ?	-Curiosity	
106		68	**-(Activity 10)**		
			-Do you see--------------- -----------leaves or roots ?	-Curiosity	
			-Draw its structure--------	-Honesty and Truthfulness	
		69	**-(Activity 11)**		
			-Do you see any roots---- -------------------these ?	-Curiosity -Honesty and Truthfulness	

107		71	-Can you classify-----------------------certain groups?	-Systematic Reasoning	
			-How would--------do it ?	-do-	
			-Where would---------------------------------------begin	-do-	
		76	-What about you---------------------------------vertebrate	-do-	
		78	-Can you think of-------------------body covering?	-Quest for knowledge -Curiosity	
			-Group the animals-----------------body coverings	-Systematic Reasoning	
107-108		79	-Can you think of------------------------this type	-Quest for knowledge -Curiosity	
			-Can you name-----------------------------------eggs	-Quest for knowledge -Curiosity	
			-Can you name-------------------------------------ones	-Quest for knowledge -Curiosity	
109		81	**-(You Now Know)**		
			-There is------------------------------characteristics	-Precision	
109-110		82	**(Now Answer These)**		
			-Question No.3-----------	-Systematic Reasoning	
			-Question No.7-----------	-do-	

Chapter : Eight

Title: Structures and Functions of the Living Body

Page	Section	Para	Content	Value	Remarks
111		2	-Each organ---perform	-Appreciation (of beauty of nature)	
			-It would be-----------------------------------successfully	-Curisoity	
	8.1		**-(Specific Parts of Plants)**		
		4	-When you look-------------------------------------ground ?	-do-	
		5	-Let us find--plant	-do-	
112		9	-Roots also help---------------------------------------away	-Appreciation (of knowledge)	
		11	**-(Activity 1)**		
			-Observe carefully--------------------------------different ?	-Curiosity	
		12	-Can you name---eat ?	-do- -Quest for knowledge	
		13	-Do you see---branches ?	-Curiosity	
			-Do some of--soil ?	-do-	
			-Do you find------------------------------------(Fig.8.3)	-do-	

			-Do You --roots ?	-do- -Quest for knowledge	
		14	-They support--roots	-Quest for knowledge	-Brief information about maize plant is given and rest is left to students to find out.
113		16	-The stem is---trunk	-Appreciation (of nature)	
		17 (Box)	-The largest plant-------------------------------years old	-do-	
114		19	**-(Activity 2)**		
			-Observe what------------------------------------happens	-Curiosity	
			-Into what parts---------------------------------------go ?	-do-	
			-How did--travel	-do-	
		20	**-(Activity 3)**		
			-Do you---roots?	-do-	
		22	**-(Activity 4)**		
			-Can you see--------------------------------------leaves?	-do-	
115		23	-The leaves---areas	Appreciation(beauty of nature)	
		24, 25	**-(Activity 5)** -Do you see--stem?	-Curiosity	
			-How do--plant?	-do- -Quest for knowledge	
		25	Tendrils help---------------------------------------object	Appreciation (of nature)	

115		26	-Look at the-------------------- ----------------------locality	-Quest for knowledge	
		27	-Do you------------------------- ----------------------colour ?	-Curiosity	
		28	-After seeing------------------ ------------------------paper	-do-	-Two lines are required to be added here to explain the purpose of taking impression of the leaves on paper.
116		31	-Do you know------------------ -------------------------plants?	-Curiosity	
			-Do all plants------------------ ----------------------flowers ?	-do-	
			-Do they---------------------- -------------------------smell ?	-do-	
			-Smell the rose---------------- -------------------------smell?	-Quest for knowledge	
		32	-Why do------------------------ -------------------------others?	-Curiosity	
117-118		38	-**(Answer these)**		
			-Question No.2--------------	-Systematic Reasoning	
			-Question No.3--------------	-Quest for knowledge	
			-Question No.4--------------	-Systematic Reasoning	
			-Question No.5--------------	-do-	
118	**8.2**		-**(Organ Systems in Animals)**		
		39	-You should know------------ ----------------------better	-Curiosity	
		43	-(**Activity 8)**		
			-Look into a ----------------- ----------------------have?	-Curiosity	

			-Look into your---------------- ---------------------alike ?	-Curiosity -Spirit of Team Work	
119		46	-It is also------------------------ ---------------------speaking	-Appreciation (of knowledge)	
119-120		47	**-(Activity 9)**		
			-Blindfold a friend----------- ------------------------tongue	-Spirit of Team Work	
			-Do all parts------------------- -------------------------tastes?	-Curiosity	
			-Which part--------------------- ----------------------------sour	-do-	
			-See Fig.8.15------------------ --------------------tongue	-Quest for knowledge	
120		52	-Oxygen helps---------------- ---------------------------life	-Appreciation (of knowledge)	
120-121		55	**-(Activity 10)**		
			-Does the air------------------- ---------------------force ?	-Curiosity	
121		57	-Have you ever---------------- ------------------------nose?	-do-	
		58	-But,if you---------------clean	-Systematic Reasoning	
			-So,always---------------------- -----------------------body	-Appreciation (of knowledge)	
		61	-This is the way-------------- --------------diaphragm	-Appreciation (of knowledge)	
		63	-Why is the--------------------- --------------------needed?	-Curiosity	
122		64	-Where is your---------------- ---------------------body?	-do-	-Curiosity is killed with immediate answer.
		65	-What is the------------------- ---------------------heart ?	-do-	-do-

		66	**-(Activity 12)**		
			-Observe your---skin ?	-do-	
123		69	-Now try to listen-------------------------------------two	-do-	
		70 (box	**-(Do you know)**		
			-Neil Armstrong------------------------------------moon	-Appreciation (Achievement of a scientist)	
			-The average heartbeat------------------------heartbeats	-Quest for knowledge	
		71	-Where and---pulse ?	-Curiosity	
			-Have you---patient	-Curiosity	
		72-76	**-(Activity 14)**		
		72	-Let us feel--minute	-Curiosity	
		73	-What do---feel?	-do-	
		74	-Do you feel some---------------------------thumping ?	-do-	
		75	-Do you--pulse ?	-do-	
			-Where else--pulse?	-Curiosity -Quest for knowledge	
		76	-Do you find---rate ?	-Curiosity	
		77	-How do we feel-------------------------------changes ?	-do-	

			-How do we------------------- -------------------changes ?	-do-	
124		82	**-(Activity 15)**		
			-Can you identify them ?	-do-	
			-Can you distinguish--------- ----------------------other ?	-do-	
		83	-Can you think---------------- -------------------------eyes?	-Curiosity -Quest for knowledge	
		85(box)	-Can a snake------------------- --------------------reacts	-Curiosity -Systematic Reasoning	
124-125		90	-If there is--------------------- -----------------------------end	-Appreciation (of nature)	-Importance of nature in life
125-126		95	**-(Activity 16)**		
			-What do you observe ?	-Curiosity	
		96	-Did you find------------------	-do-	
			-You can imagine------------- --------------------------part	-Appreciation (of nature)	-Importance of all the parts of the body is emphasized.
126		97	**-(Answer these)**		
			-Question No.2--------------	-Systematic Reasoning	
		98	**-(You Now know)**------------ Living---------Coordination	-Precision	
126-127		99	**-(Now Answer these)**--------		
			-Question No.5-------------	-Systematic Reasoning	

Chapter: Nine
Title: Air

Page	Section	Para	Content	Value	Remarks
129		1	-No living thing can---------------------------------air	-Appreciation(of nature)	
			-Is air made up---------------------------------matter?	-Curiosity	
	9.1		**-(Air is All Around)**		
		5	-Look at Fig.9.1--------the box (including Fig.9.1)	-Curiosity	-Word 'No' in the explanation should be removed . It could be replaced with 'let us see' or 'Let us probe'. -From Psychological point of view word 'wrong' is also objectionable.
		6	**-(Activity 1)**		
			-Does water enter--------------------------------bottle?	-Curiosity	-To create curiosity one more interrogative sentence is required to be added such as 'if not, why it does not'.
130		7	-You will find---------------------------water(Fig.9.2)	-do-	-Bubbles could be used as puzzle and it can

					develop curiosity to know about presence of air,. 'of air'should be removed from the sentence.
	9.2		**-(Air is a Mixture)**		
		9	-Experiments have---------------------------------gases.	-Verification	-Science is based on verification /evidence.
		9	-(Fig.9.4)Composition of air----------------------------	-Precision	-Figure represents more precisely the composition of air than given in the text.
131		11	-Have you ever-----------------------------the air?	-Curiosity	-Answer should not be provided immediately after the question.
		12	-Have you seen---------------------------------from ?	-do-	
		13-14	**-(Activity 3)**		
			-Take two tea spoonfuls-----------------------faster	-Systematic Reasoning	
132		17	**-(Activity 4)**		
		18,19 Fig.9.6	-Take a glass----------------------------------burning	-Systematic Reasoning	
			-Why does the candle-----------------------burning?	-Curiosity	
			-Why does the water----------------------------bottle?	-do-	

		20	-The major part of--------- -------------------------fills	-Precision	-accuracy is specified
			-Nitrogen is important----- --------------------growth	-Appreciation (of nature)	
	9.3		**-(Air is necessary for living)**		
132-133		22	-You have already--------- -----------------difficulties	-Appreciation (of knowledge)	
		23	**-(Activity 5)**		
			-You will find------------- ------------------finally die	-Against protection of Environment	-This activity may be substituted by another one or the sentence may be modified by deleting 'finally die.'
			-Why do they die?--------	-Curiosity	
		24	-You might wonder-------- --------------------water	-Appreciation -Reasoning	
			-Where do these------------ ---------------------from ?	-Curiosity -Reasoning	
		25	**-(Activity 6)**		
			-Take some water---------- -------------------in water	-Systematic Reasoning	
134		26, Fig.9.9	-In nature the-------------- -------------maintained	-Appreciation (of nature)	

	9.4		**-(Air is useful to Human Beings)**		
		28	-Air is required------------------------------respiration	-Appreciation	
134-135		29	-Air is necessary-------------------------------things	-do-	
			-Burning cannot---------------------------------of air	-do-	
		30	-The smoke is------------------------------affected	-Protection of Environment -Appreciation (of knowledge)	
		31	-Vehicles such as------------------------------easier	-Appreciation (of knowledge)	
		32	-You play--air	-do-	
135-136		33	-Compressed air-------------------------------mine	-do-	
136		34	-Compressed air------------------------stopping trains	-do-	
		35	-Air helps---------------------------------------wind	-do-	
		36	-People feel cool--------------------------------body	-do-	
		37	-You have already-------------------------------grains	-do-	
		38	-Air helps-------------------------------------in air	-do-	

		39	-Air makes the------------------------------electricity	-Appreciation (of knowledge)	
		40	-Air helps-----------------------------------of flowers	-do-	
		42	**-(You Now Know)**		
			-Living ------coordination	-Precision	-Provided the teacher explains to the students that the entire explanation has been included in the following points briefly and accurately (i.e. connection of the conclusions with the textual material should be established).
		43	**-(Now Answer These)**		
			-Question No.9------------	-Systematic Reasoning	
			-Question No.13----------	-do-	
			-Question No.14----------	-do-	

Chapter:Ten
Title: Water

Page	Section	Para	Content	Value	Remarks
139		1	-Water is the-----------------us	-Appreciation (of nature)	
			-We use--industries	-Appreciation (of knowledge)	
			-It is important--will die	-Appreciation (of nature)	
			-Water has--important	-Appreciation (of knowledge)	
	10.1		**-(Water is Essential for Life)**		
		2	-Water is an--bodies	-Appreciation (of nature)	
			-Human beings---water	-do-	
		4	-Water helps---water	-do-	
139-140		5	**-(Activity 1)**		
			-Soak some quantity------------------------------germinate	-Systematic Reasoning	-Activity could be used to emphasise 'verification' by adding two lines to the paragraph before the activity conveying that 'you can verify it, or see for yourself.
			-What do you observe?--------	-Curiosity	

140		6	-**(Activity 2)**		
			-Put some water------------------ -------------------------------food	-Systematic Reasoning	
			-What do you notice ?----------	-Curiosity	
			-How does it happen?----------	do-	
			-Thus you see--------------------- ----------------------------plants	-Precision	
		7	-Most of the life------------------ ------------------------------water	-Appreciation (of nature)	
		9	-You have already-------------- ----------------------------high	-do-	
		10	-Largest amount----------------- -----------------------electricity	-Appreciation (of knowledge)	
		11	-Water turns the----------------- ------------------------------water	-do-	
		12	-In some countries-------------- -------------------------------cool	-do-	
141	**10.2**		-**(Sources of Water)**		
141		14	-The largest amount------------ -----------------------------oceans	-Appreciation (of nature)	
			-The sea water------------------- ----------------------agriculture	-Objectivity	

		16	-Water obtained---in it	-do-
		17	-The water has--taps	-Appreciation (of knowledge)
		18	-The water from------------------------------permanganate	-do-
		19	-Even the rain--------------------------------------drinking	-Objectivity
141-142		20	-You can easily--it	-Verification
	10.3		**-(Physical Properties of water)**	
143		28	-Try to dissolve-----------------------------------in water	-Quest for knowledge
		29	-The quantity of--------------------------------temperature	-Precision
			-Water dissolves---water	-Appreciation (of knowledge)
143-144		31	-This property of water--------------------------------organisms	-do-
144		32	**-(Answer these)**	
			-Question No.4-----------------	-Systematic Reasoning
	10.4		**-(Water Cycle in Nature)**	
		34,35, 36	**-(Activity 6)**	

		34	-To understand the water------ ---------------------------- regions	-Systematic Reasoning	
		36	-Can you make cloud ?--------	-Curiosity	
		37	-You will see ---------------- ----------------------mini cloud	-Verification	
145		39	-The water----------------------- -------------------------weather	-Appreciation (of nature)	
		Fig. 10.8	-Water cycle in nature---------	-Precision	
		40	**-(Answer these)**		
			-Question No.2----------------	-Systematic Reasoning	
	10.5		**-(Hard and Soft Water)**		
145-146		41	-This is due to------------------ --------------------------in water	-Reasoning	
146		42	**-(Activity 7)**		
			-Take an equal------------------- -----------------------soft water	-Systematic Reasoning	
		43	**-(Activity 8)**		
		44	-Take two test tubes----------- -------------------------with soap	-do-	
		46	-Hard water---------------------- ------------------industrial uses	-Appreciation (of knowledge)	
			-The hardness of water--------- -----------------------purposes	-Objectivity	
147	10.6		**-(Uses of water)**		

			-To remain alive--water	-Appreciation (of knowledge)	
		49 and Fig. 10.9	-Gain and loss of water--------	-Precision	
		50	-Industries---water	-Appreciation (of knowledge)	
		51	-Many animals---water	Appreciation (of knowledge)	
		52	-Water is a good--------------------------------(logs of word)	-do-	
		53	Water acts as--animals	-Appreciation (of knowledge)	
		54	-The seeds-------------manner	-do-	
		55	-Many people---people	-do-	
		56	-Water also provides--------------------------------sking	-do-	
148	10.7		-**(Conservation of Water)**		
		58	-After use in home-------------------------------------pollution	-Protection of Environment (Sources of contamination)	
		59	-If we drink---diseases	-Protection of Environment (Concern)	-Concern for human beings' health
		60	-The pollution can be--------------------------------------clean	-Protection of Environment (Conservation)	
		61	-To make it safe-------------------------------------treatment	-do-	

148-149		62	-Water must not--trees	-do-	
149		63	-The scarcity of---dams	-do-	
		65	-**(You Now know)**		
			-Water is---------------wasted	-Precision	
149-150		66	-**(Now Answer these)**		
			-Question No.3-----------------	-Systematic Reasoning	
			-Question No.5-----------------	-do-	
			-Question No.6-----------------	-do	
			Question No.7------------------	-Precision	
			-Question No.9----------------	-Systematic Reasoning	

Chapter: Eleven
Title: Energy

Page	Section	Para	Content	Value	Remarks
151	11.1		**-(What is Energy)**		
		2	-How do you——————tired?	-Curiosity	
			-Why is your energy reduced?——	-do-	
			-How do you know——————————————related	-Systematic Reasoning	
	11.2		**-(What is Work ?)**		
		4	-In which of——————————————done ?	-Curiosity	
151-152		5	-How do you——————————————work done ?	-do-	
152		6,7,8	-In Fig.11.2(a)——————————————object	-Systematic Reasoning	
		8	-It can, therefore,——————————————object	-Precision	
153		9	-Let us——————energy	-Curiosity	
		10,	**-(Activity 10)**		
		11	-Take a brick——————————————doing work	-Systematic Reasoning	
		10	-Did you do——————brick?	-Curiosity	
			-What happens——————————————moving?	-Curiosity	

		12, 13,14	-(**Activity 2**)		
		13	-Take a piece of————————————————capable of doing	-Systematic Reasoning	
		14	-Your observations————————————————of doing	-Precision	
154		15	-(**Answer these)**		
			-Question No.1——————	-Systematic Reasoning	
	11.3		-(**Different Forms of Energy**)		
		18	-Suppose you stretch————————————————energy	-do-	
		19	-Similarly————————————————energy	-do-	
		20	-If you take————————————————down	-do-	
		21	-A torch cell————————————————working	-do-	
154- 155		24	-The food which————————————————are asleep	-do-	
155		26	-When you boil————————————————steam	-Systematic Reasoning	
			-James Watt——————engine	-Appreciation (of processes of science)	-The processes of science help to invent products.
		27	-You must————————————————lanterns	-do-	
			-Thus you see——————energy	-Precision	
		28	-Have you ever————————————————object	-Curiosity	

			-In our daily lives————————————move it	-Objectivity	
			-Do you know————————————increases?	-Curiosity	
			-There are very————————————of energy	-Systematic Reasoning	
		29	-Due to this————————————energy	-Appreciation (of knowledge)	
156		30	-Like light————————————of energy	-do-	
			-How do you————these?	-Curiosity	
			-Your ears have————————————sound	-Systematic Reasoning	
		31	-In agriculture————————————mills	-Appreciation (of knowledge)	
	11.4		**-(Sources of Energy)**		
		33	-Plants are the————————————animals	-do-	
		35	Coal is formed————————————earth	-do-	
157		37	-Find out the————————————located	-Curiosity	
		38	-The fossil fuels————————————form	-Appreciation (of knowledge)	
		39	-The sun has been————————————cost	-Appreciation (of nature)	

			-The sun is——————energy	-do-	
157-158		40	-Scientists——————————————(Solar Energy)	-Appreciation (of knowledge)	
			-They have been————————————————satellites	-Appreciation (of products of science)	
			-Find out the——————used	-Curiosity	
158		41	-Wind also provides———————————————environment	-Appreciation (of nature)	
		Fig. 11.6	-The sun is——————energy	-Precision	
		42	-This idea is————————————————wind vane	-Appreciation (of knowledge)	
			-These windmills———————————————electricity	-Appreciation (of knowledge)	
158-159		43	-It is free—————————————————environment	-Appreciation (of nature)	
			-The flowing water————————————————country	-Appreciation (of knowledge)	
159		44	This idea is————————————————generate electricity	-do-	
		45	-Find out the names————————————————if any	-Curiosity	
159-160		46	-It is the oldest————————————————energy	-Appreciation (of knowledge)	

			-This gas can be——————etc.	-do-	
160		47	-Water,wind——————them	-do-	
		48	**-(Answer these)**		
			-Question No.3——————	-Systematic Reasoning	
161		49	**-(You Now Know)**		
			-Work is————wasted	-Precision	
		50	**-(Now Answer These)**		
			-Question No.8——————	-Systematic Reasoning	
			-Question No.9——————	-do-	
			-Question No.12——————	-do-	
			-Question No.13------------------	-do-	

Chapter: Twelve
Title: Balance in Nature

Page	Section	Para	Content	Value	Remarks
163		2	-Do you know----------- ------------------nature?	-Curiosity	
	12.1		**-(Interdependence of Organisms)**		
164		4	**-(Activity 1)**		
			-From the following---- ----- -------cod liver oil	-Curiosity	
		5	-Can you think---------- ---------------------lives?	-do-	
		11	**-(Activity 2)**		
			-From fig.12.7---------- -------------------animals	-Curiosity -Quest for knowledge -Honesty and Truthfulness	
		17	**-(Activity 3)**		
166-168			-Make a list-------------- --------------------below	-Curiosity -Quest for Knowledge -Honesty and Truthfulness	
168		19	-The excreta of --------- ---------------------plants	-Appreciation (of knowledge)	
		20	-You have seen---------- -------------------ways	-Appreciation (of Interdependence)	

			-However, neither------ --------------------water	-Appreciation (of nature)	
	12.2		-**(Food Chain)**		
168-169		22	-Non-living things------ --------------------nature	-Appreciation (of nature) -(of Interdependence)	-The interdependence of organisms is emphasized.
169		23	-What is the-------------- -------------------earth ?	-Curiosity	
		24	-How do plants---------- --------------------sun ?	-do-	
169-170		25	-Can you identify------- ----------------animals ?	-Curiosity -Quest for knowledge	
			-Draw the food chain--- ---------------------------	-Precision	
170		29	-**(Answer these)**		
			-Question No.3----------	-Systematic Reasoning	
171	**12.3**		-**(Balance is Essential in Nature)**		
		32	-Thus,disturbing-------- -------------------nature	-Appreciation (of knowledge)	
		33	-Therefore, all forms--- -------------------nature	-Appreciation (of nature)	
		34	-Man has been----------- --------------------uses	-Protection of Environment	-misuse of environment by man has affected

			-Thus, by destrying------------------------actions	-do- (concern)	resources and life of other creatures i.e. disturbed the balance in nature.
		35(box)	-Do you know--------------------------------rats ?	-Appreciation (of knowledge)	
			-A pair of rats--------------------------------year	-do-	
			-Snakes kill----------------------------------grains	-do-	
			-Can you imagine-----------------------snakes?	-Curiosity	
			-Should we then---------------------------sight?	-Protection of Environment (Concern for protection)	
173		37	-Modernisation and--------------------------nature	-Objectivity	
174		42	-Name some-------------------------------water	-Quest for knowledge	
		43	-**(Answer these)**		
			-Question No.2----------	-Systematic Reasoning	
		44 (Box)	-Each one of us--------------------------animals	Responsibility	
			-You can learn-----------------------------them	-Quest for knowledge -Protection of Environment (Creatures)	

			-You should--------------------------------plants	-Protection of environment (Plants)	
			-You should------------------------------trees	-do-	
			-Even if you-----------------------------not lost	-Protection of Environment (conservation of soil)	
			-You should-----------------------neighbourhood	-Protection of Environment (Water)	
175		45	**-(You Now Know)**		
			-All living---------------------------every way	-Precision	
		46	**(Now Answer These)**		
			-Question No.1----------	-Quest for knowledge	
			-Question No.2----------	-Quest for knowledge	
			-Question No.3----------	-Quest for knowledge	
			-Question No.5----------	-do-	
			-Question No.7----------	-Systematic Reasoning	
			-Question No.10--------	-Creativity -Quest for knowledge	

Chapter: Thirteen
Title: The Universe

Page	Section	Para	Content	Value	Remarks
177		1	-As a result--------------------------------------universe	-Appreciation (of knowledge)	-Contribution of Scientists
			-Scientists have---universe	-Perseverence	
		2	-Do you know how vast------------------------------this unit	-Curiosity	-Too many questions together do not increase curiosity. It could have been first question followed by the sentence that knowledge of universe helps us to know about how heavenly bodies move in space, about satellites etc.
	13.1		**-(What is Universe ?)**		
		4	-They are much--us	-Appreciation (of nature)	
		7	-It looks much-------------------------------------from us	-do-	

116

177-178		8	-Even two--apart	-do-	
178-179		9	-Even this unit----------------------------------another	-do-	
			-Can you image------------------------------------is ?	-Curiosity	
179		10	-There are some-------------------------------the earth	-Appreciation (of nature)	
		11	-It is made---stars	-do-	
		13	-**(Answer these)**		
			-Question No.4--------------	-Systematic Reasoning	
	13.2		-**(Constellations)**		
		14	-All the stars-------------------------------------same	-Appreciation (of nature)	
		15	-One of the most-----------------------------Ursa Major	-Appreciation (of knowledge)	
181		18	-The polar star--sky	-do-	
182		20	-Orion is---------------------------------------constellation	-Appreciation (of nature)	
183		21	-Can you tell-------------------------------------to west ?	-Curiosity	
		22	-You must have-----------------------------------to east	-Systematic Reasoning	

184	**13.3**		**-(The Solar System)**		
185		29	-Jupiter is the---planet	-Appreciation (of nature)	
		32	-India has also---INSAT	-National Pride -Appreciation (products of Science)	-India's achievements and Indigenous products highlighted
186		33	-Some of the uses-----------------------------------space	-Appreciation (of knowledge)	-Uses of satellites in improvement of life
187		36	-Venus is--sky	-Appreciation (of nature)	
			-Moon is the--venus	-do-	
		38	**-(Answer these)** -Question No.7-------------	-Quest for knowledge	
			-(You Now Know)		
188		39	-The stars-----------------------------------planets	-Precision	

Class-VII

Chapter : One
Title: States of Matter

Page	Section	Para	Content	Value	Remarks
1		1	-Why is stone----------------- gas ?	-Curiosity	-No immediate answer is there in the text. So curiosity remains.
			-Do all the objects------------ ---------------------------------- -----------matter?	-do-	
	1.1		**-(Solids and Liquids Have-- ---------------------------------- --Do not)**		
		2	-A simple experiment-------- ---------------------------------- difference	-Verification	
		4	-The higher the temperature- ---------------------------------- --motion	-Precision	
			-That is why a gas------------ ---------------------------------- -----space	-Appreciation (of knowledge)	-Scientific Processes
1-2		5	-In a solid---------------------- ---------------------------------- ---slip away	-do-	
2					
		6 (Box)	-The earth has a blanket------ ---------------------------------- Jupiter	-Quest for knowledge	

		7	-Do you know---road side	-Curiosity	
		8	**-(Activity 2)**		
			-If you like this--flow	-Quest for knowledge	
2-3		9 (box)	-That solids can also------------------------------------consequences	-Curiosity	
			-That solids can also---idea	-Quest for knowledge	
3		10	-Is it a solid------------------gas?	-Curiosity	
			-It is not spreading--solid	-Systematic Reasoning	
			-Is this sponge--compressible?	-Curiosity	-Curiosity is killed with immediate answer.
			-How is that ? Let---activity	-Curiosity	
		11-12	**-(Activity 3)**		
			-Where was the air---sponge ?	-do-	
		12	-The sponge had many---pores	-Systematic Reasoning	

		13	-This property of soil---plants	-Appreciation of knowledge	
			-Do you think the clothes------------------------------------- materials?	-Quest for knowledge	
	1.2		**-(Movement of Molecules)**		
		14	**-(Activity 4)**		
			-Mark the time---to mix	-Honesty and Truthfulness	
		15	-You may now stand---flame	-Spirit of team work	
			-Note the time--- fragrance	-Honesty and Truthfulness	
4		19 (box)	-Do the solids diffuse ?-----------	-Curiosity	
			-However the process---slow	-Appreciation (of knowledge)	
			-Often geologists---occurred	-Quest for knowledge	
		20	**-(Activity 5)**		
			-Let us see an----------------- solid	-Curiosity	

4-5		22	-Do you know why--water?	-do-	
			-Look at Figure 1.2---hurt	-Systematic Reasoning	
			-Hay or Sand is put--jump	-do-	-Why this is done requires some explanation. This sentence is quite abrupt.
5		23	**-(You Now Know)--------** -Solids have -------compressible	-Precision	Summary
5-6		24	**-(Now Answer these)**		
			-Question No.2------------------	-Systematic Reasoning	
			-Question No.3---------------------	-do-	
			-Question No.4(i)--------------------	-do-	
			-Question No.7---------------------	-do-	-Answer is not directly provided in the text.

Chapter: Two
Title: Elements,Compounds and Mixtures

Page	Section	Para	Content	Value	Remarks
7	i	1	-Things around you--------- -------------------------------- variety	-Appreciation	
			-But what is matter---------- ---------------------------------- ----kind ?	-Curiosity	
	2.1		**-(Matter as Molecules and Atoms)**		
8		8	-Notice the difference------- ----------Fig.2.1(including Fig.2.1).	-Precision	
8-9		9	-You may wonder ---------- ------------------------------- compound.	-Curiosity	
			-It was only 200------------- ------------------------------- compound.	-Appreciation (of knowledge)	-Contribution of scientist
			-Further proof came--------- ------------------------------- electricity.	-Verification	
			-Sir Humphry Davy--------- ---------------------------------- -Oxide.	-Appreciation (of knowledge)	-Contribution of scientists
		11(box)	-Lavoisier,the French------- --------------------------- compound	-do-	-do-
9-10		12,13	**-(Activity 1)**		
10		13	-Test the gas----------------- --------------------------------- oxygen	-Verification	

		14 15,16	**-(Activity 2)**		
			-Is Sugar an element---------------------hydrogen and oxygen	-Systematic reasoning	
11	**2.2**		**-(Symbols and Formulae)**		
		19	-Figure 2.4 shows--crust (including figure)	-Precision	
12		24(box)	-John Dalton---symbols	-Appreciation (of knowledge)	-Contribution of scientist
			-It was J.J.Berzelius---symbol	-do-	-do-
13		25	-How then can we------------------------------------compound?	-Curiosity	
		29	-Thus,if we know---examples(including Table 2.5 page 14)	-Precision	
15		32	**-(Answer these)**		
			-Question No.5------------------	-Quest for knowledge	
	2.3		**-(Chemical Reactions and Equations)**		
16		37	-Thus, a chemical---reaction	-Precision	-Summary
		39	**-(You Now Know)----------**		
			-Matter----------side	-Precision	

Chapter : Three
Title : Acids, Bases and Salts

Page	Section	Para	Content	Value	Remarks
19		2	-An oxide is thus----------- -Oxygen	-Precision	
			-(Activity 1) -Caution Do not-------------------long !	-Curiosity	-Curiosity is there but no way to find answer is given. Perhaps teacher may explain it to students.
20		7	-A convenient test---------- blue	-Verification	
			-(Activity 2) -It shows the acidic--------- -property	-do-	
		10	**-(Activity 3)** -You will see that ------- solution	-do-	
21	3.2		**-(Properties of Acids and Bases)**		-3.1 Section is not indicated in the chapter
		12	-We have seen---------- bases (including Table 3.1)	-Precision	
		13	-One important property------gas	-Appreciation (of knowledge)	
21-22		14	-In everyday life--------- juice do	-do-	
22		15(**Box**)	-What do you-----------------then?	-Curiosity	
			-Of course, the best-----------vessels	-Curiosity	

				-Quest for knowledge	
22		16	-What about bases-------------life ?	-Curiosity	
		17(Box)	-A frequent complaint---------antacids	-Systematic Reasoning	
			-Now you know---------antacids	-Appreciation (of knowledge)	
22-23		**18**	**(Answer these)**		
			-Question No.1----------	-Quest for knowledge	
			-Question No.4------------	-Systematic Reasoning	
23	**3.3**		**-Reactions of Alkalies with Acids)**		
		19	-What will happen---------------activity	-Curiosity	
		21	-What change do you observe ?	-do-	
		22	-Thus, when the solution------------------neutralisation	-Systematic Reasoning	
		23	-Similar activities--------------solutions	-Quest for knowledge	
24		25	**-(Answer these)** -Question No.3-----------	-Quest for knowledge	
	3.4		**-(Salts)**		
25		27	-Many salts come-------------compounds	-Appreciation (of knowledge)	-Information is related to daily life.

		28	-Washing Soda----------------powders	-Appreciation (of knowledge)	-Utility in daily life and in industry.
		29	-Sodium bi carbonate-------------------extinguishes	-do-	-do-
		30	-Potassium nitrate---------------industry	-do-	-do-
		31	-Copper sulphate----------------printing	-do-	-do-
		32	-Potash alum---------------water	-do-	-do-
		33	-They are used in cleaning----------------paper	-do-	-do-
25-26		38	-That is why--------------salty	-Appreciation (of knowledge)	
26-28		40-42	**-(A Project:Preparation of------------Properties)**		
		41	-Let us collect----------properties	-Curiosity	
26		42	(i)-Carbon dioxide is--------------properties	-Quest for knowledge	-desire for further learning is created
			(ii)-This is used in fine---------------buildings	-Appreciation (of knowledge)	-Application
27			(iii)-You can do this-----------------the jar	-Verification	
28		43	**-(You Now Know)---------**		
			-Most of----------------carbonates	-Precision	Summary
		44	**-(Now Answer these)**		
			-Question No.5	-Systematic Reasoning	

Chapter : Four
Title : Heat

Page	Section	Para	Content	Value	Remarks
30	**4.1**		**-(Effects of Heat)**		
		4	-Heat can even kill !	-Curiosity	
			-In fact we boil----------------------chicken !	-Appreciation (of knowledge)	-Application
		5	**-(Expansion)**		
			-Let us perform-------------------property	-Curiosity	-Students are invited to experiment and study
30-31		6	**-(Activity 1)**		
			-What happens----------------pointer ?	-Curiosity	
31		7	**-(Activity 2)**		
			-Now heat the ball----------------ring	-do-	
32		10	-These activities show--------------most	-Precision	-Brief conclusion drawn from activities
			-Even the heat----------------Tube	-Appreciation (of knowledge)	
		11	-Such expansion on---------------wheel	-do-	-Information related to daily life
		12	**-(Answer these)**		
			-Question No.1------------	-Systematic Reasoning	
			-Question No.2----------	-do-	

			-Question No.3	-do-	
	4.2		**-(Hotness and Temperature)**		
		13	-Even if their heat----------------man	-Objectivity	-emphasis on reliability of information is given.
		14	-We can use---------------------temperature	-Appreciation (of knowledge)	-Usefulness
		15	-However, this method-----------expansion !	-Objectivity	
32-33		16	**-(Answer these)**		
			-Question No.2---------	-Quest for knowledge	
33		Table	-(Some common Temperatures)---------	-Appreciation (of knowledge) -Quest for knowledge)	-Information related to various items of interest in life is given
	4.3		**-(Amount of Heat)**		
		17	-Let us see-----------------substances	-Curiosity	
		20	-We can, therefore,------------------taken	-Systematic Reasoning	
				-Precision	
			-This property helps---------------heat	-Appreciation (of knowledge)	
34		23	-What would happen-------------find out	-Curiosity	
		24-25	**-(Activity 6)**		

			-Take two beakers------ ---------that of water	-Systematic Reasoning	
			-In fact, water has------ ------substances	-Appreciation (of knowledge)	
			-Table 4.1 is a --------- -------substances	-do-	
			(including table 4.1)	-Quest for knowledge	
35		28 (Box)	-Why did the temperature----------- melted?	-Curiosity	
			-Remember that--------- --boiling point	-Systematic Reasoning	
36		31	**-(Answer these)**		
			-Question No.2	-Systematic Reasoning	
		32	-It is important--------- substances	-Quest for knowledge	
		33	-But remember--------- supply !	-Objectivity	
		34	**-(You Now Know)—**		
			-Heat is----------- boiling point	-Precision	Summary
37		35	**-(Now Answer These)**		
			-Question No.1--------	-Systematic Reasoning	
			-Question No.2--------	-do-	
			-Question No.3-------	-do-	
			-Question No.4-----	-do	

Chapter : Five
Title: Transfer of Heat

Page	Section	Para	Content	Value	Remarks
38		1	-Of course, the increase---------- ------------------------------------ ----spoon	-Objectivity	
	5.1		-**(Conduction of Heat)**		
39		6	-Remember that there------------ ------------------------------------ ---------------one	-Appreciation (of knowledge)	
		7	-Let us compare------------------ ------------------------------------ ---------substances	-Curiosity	
		8	-**(Activity 2)**		
		9	-From which of the-------------- ------------------------------------ -------first ?	-Curiosity	
			-You will note that-------------- ------------------------------------ -------------------iron	-Systematic Reasoning	
			-Aluminium is------------------- ---iron	-Precision -Appreciation (of knowledge)	
		10	-Metals like silver--------------- ------------------------------------ ---------not	-do-	

39-40		11	-We make use of--fire	-do-	
40		12	-**(Answer these)**		
			-Question No.1-----------------------	-Systematic Reasoning	
			-Question No.2---------------------	-do-	
	5.2		-**(Convection)**		
		15	-Let us do---this	-Curiosity	
40-41		16	-**(Activity 4)**		
			-Does the wax---melt ?	-do-	
41		17	-In the above--melt	-Systematic Reasoning	
		18	-But could not the--conduction	-do-	
		19	-Air too is not a --- compartment	-Appreciation (of knowledge)	
		20	-Only liquids and gases---do	-Precision	
		21	-**(Answer these)**		
			-Question No.2-----------------------	-Systematic Reasoning	

			-Question No.3--------------------- ----	-Quest for knowledge	-Students may also find reasons from other sources
	5.3	22	**-(Radiation)**		
			-This is why this------------------ ------------------------------------ -radiation	-Appreciation (of knowledge)	-Process of science
		23	-This is how we------------------- ------------------------------------ --planets	-do-	-do-
41-42		24	-The farther the two-------------- --------------------------------- transferred	-Precision	
42		25	-In table 5.1 ---------------------- ------------------------------------ ------right time (including table)	-do-	
		26	-This is a direct------------------- ------------------------------------ ---the sun	-Appreciation (of Knowledge)	
		27	-They are thus--------------------- ------------------------------------ -------time	-do-	
		28(box)	-But the planets------------------- ------------------------------------ ---day time	-Objectivity	
		29	-There is another------------------ ------------------------------------ ------this	-Curiosity	
42-43		30, 31,32	**-(Activity 5)**		
			-Take two tin cans---------------- -------------------------------- lighter colours	-Systematic Reasoning	
			-Thus we conclude--------------- ---------------------------------- lighter colours	-Precision	

43		33	**-(Answer these)**		
			-Question No.1---------------------	-Systematic Reasoning	
			-Question No.2----------------------	-do-	
		34	**-(You Now Know)**		
			-Heat is----------------better	-Precision	
43-44		35	**-(Now Answer These)**		
			-Question No.3------------------------	-Systematic Reasoning	
			-Question No.5-----------------------	-do-	
			-Question No.6------------------------	-do-	
			-Question No.7------------------------	-do-	

Chapter : Six
Title: Light and Shadows

Page	Section	Para	Content	Value	Remarks
45	6.1		**-(Sources of Light)**		
		2	-The most important-------------------------source	-Appreciation (of knowledge)	-beauty of nature
			-Stars are natural---------------sky	-do-	
			-The glow-worm----------------book	-do- -Objectivity	
		4	-A firefly is a very------------------------------candle	-Appreciation (of knowledge)	
45-46		6	**-(Activity 1)**		
			-Does the brightness-------------------------same	-Verification -Quest for knowledge	-If a sentence like 'what do you conclude from it' ? was added , it could lead to the statement given in para 5 above i.e. light gets dimmer with increase in distance. Thus emphasizing 'verification'
		Fig.6.1	-Brightness-------------------distance	-Precision	
46		7	-You can actually test-------------------------------------them	-Verification	

			-A firefly gives----------------- ------------------------------------ --------itself	-Appreciation (of knowledge)	
		8	-Why are some light----------- ------------------------------------ -----cold?	-Curiosity	
			-The reason lies in the---------- -------------------------both heat and light	-Systematic Reasoning	A good example of reasoning
46-47		9	-The moon is thus-------------- ------------------------------------ ----mirror	-Objectivity	
			-The only objects-------------- ------------------------------------ --reflectors	-Appreciation (of knowledge)	
			-To see how-------------------- ------------------------------------ --------moon	-Curiosity	
47	6.2		**-(The phases of the moon- Heavenly play of light)**		
		10	-Figure 6.2 shows-------------- -----------------------------the earth including figure 6.2	-Precision	
48		12	-Why is it visible ?------------ ----	-curiosity	
			-Because it is------------------ part	-Systematic Reasoning	
		13	**-(Answer these)**		
			-Question No.1 ----------------- -----	-Quest for knowledge	
			-Question No.2-----------------	-do-	
	6.3		**(Light Travels in a straight line)**		
		14	In order to find----------------- ------------------------------------ activities	-Curiosity	

		15	-**(Activity 2)**		
			-What is the best------------ flame	-Honesty and Truthfulness -Quest for knowledge	
48-49		16, 17	-**(Activity 3)**		
			-These activities show--------- ----------------------------------- ----line	-Verification	
		18,19	-**(Activity 4)**		
			-Make a periscope-------------	-	-The purpose of making periscope in relationship to activity is not given. There is need to add two-three lines.
	6.4		-**(Shadows)**		
50		22	-Thus objects can be ---------- ----------------------------------- -light	-Precision	
		24	-Why is this so ?--------------- ----------------------------------- -----activity	-Curiosity	
		25-27	-**(Activity 6)** -Take a wooden stick---------- ----------------------------------- --- changes	-Systematic Reasoning	
		25	-Make a chalk mark----------- ----------------------------------- -----stick	-Honesty and Truthfulness	
		26	-Now look again--------------- ----------------------------------- the shadow	-do-	
		27	-What can we say-------------- ----------------------------------- ---changes	-Precision	

		28	-There is another--------------- ----------------------------------- -----height	-Appreciation (of knowledge)	
			-The following---------------- ----------------------------------- ------done	-Curiosity	
50-51		29,30	-**(Activity 7)**		
			-Figure 6. 5(Page 51)---------- -----	-Precision	
51		30	-You have thus----------------- ----------------------------------- -----method	-Appreciation (of knowledge)	-methods of science
		31	-**(Answer these)**		
			-Question No.2---------------- ----	-Systematic Reasoning	
			-Question No.3---------------- ------	-Quest for knowledge	
	6.5		-**(The Eclipses)**		
51-52		32	-Can you name----------------- ----------------------------------- ----life ?	-do-	
			-Figure 6.6 shows eclipse (including figure 6.6)----------	-Precision	
52		33	-You will,therefore,----------- ----------------------------------- -----eclipse	-Objectivity	
53		36	-You might wonder------------ ----------------------------------- ---------day	-Curiosity	
		36,37, 38	-The Plane in which----------- ------------------------------ eclipses occur	-Systematic Reasoning	

53-54		40	-But you must--eyes	-Appreciation (of knowledge)	-Usefulness to life.
			-This is because--eclipse	-Reasoning	
			-But do not ever---damaged	-Appreciation of knowledge	
54		41	-**(Answer these)**		
			-Question No.1---------------	-Quest for knowledge	
			-Question No.2---------------	-do-	
			-Question No.4---------------	-Systematic Reasoning	
		42	-**(You Now Know)**		
			-There are-------directly	-Precision	
		43	-**(Now answer these)**		
			-Question No.1---------------	-Quest for knowledge	
			-Question No.3---------------	-Systematic Reasoning	
			-Question No.5---------------	-Precision	
			-Question No.6---------------	-Systematic Reasoning	

Chapter : Seven
Title: Mirrors and Reflection of Light

Page	Section	Para	Content	Value	Remarks
55		1	-What happens when--------- ---------------------------------- ---mirror ?	-Curiosity	
		2	-What do mirrors------------- ---------------------------------- ----chapter	-do-	
	7.1		**-(Reflection of light)**		
		3	-What does an object-------- ---------------------------------- ---on it ?	-do-	
56		6	-This is why------------------- ---------------------------------- --reflection	-Appreciation (of knowledge)	-Information related to objects of daily use.
		7	-What is the best-------------- ---------------------------------- -----mirror?	-Curiosity	
			-This is why------------------ mirror	-Appreciation (of knowledge)	-Information related to objects of daily use.
57		11	-Thus for all values---------- ---------------------------------- -------------- $\angle r$	-Precision	
		13	-In summary,we notice------- ---------------------------------- ------plane	-do-	
			-These two statements-------- -------------------------------- reflection	-appreciation (of knowledge)	-Processes of Science

		14	**-(Answer these)**		
			-Question No.2--------------- ------	-Systematic Reasoning	
			-Question No.3--------------- -------	-Systematic Reasoning	
58		15 (Box)	-The two laws------------------ ---------------------------------- ---Fig.7.4	-Quest for knowledge	-Students can be encouraged to observe the use of laws of reflection in other situations also.
	7.2		**-(Image formed by a Plane Mirror)**		
		16	-Have you ever thought------ -------------------------------- touch ?	-Curiosity	
		17	-Write the word LEFT-------- --------------------------------- ----letters	-Quest for knowledge	
59-59		20	-How does a concave--------- --------------------------------- ----detail	-Curiosity	
59-60		22 (Box)	-The laws of reflection------- --------------------------------- ----always	-Systematic Reasoning	
		24	-Look at the figure------------ --------------------------- again including Figure 7.7 b,c,d	-Precision	
61		26	-How will the light------------ ---------------------------------- --------mirror	-Curiosity	

			-This property of concave---- -------------------------------- reflector	-Appreciation (of knowledge)	-Information related to things of daily use.
61-62		27	-We can use a convex-------- -------------------------------- -----him	-do-	-do-
62		28	**-(Answer these)**		
			-Question No.1---------------- ------	-Systematic Reasoning	
		29	**-(You Now Know)**————		
			- Light is---------object	-Precision	
		30	**-(Now Answer These)**		
			-Question No.2--------------- ---	-Precision	
			-Question No.3--------------- ----	-Quest for knowledge	
			-Question No.4--------------- -----	-Systematic Reasoning	
			-Question No.5--------------- -------	-do-	

Chapter :Eight
Title: Sound

Page	Section	Para	Content	Value	Remarks
63		2	-Each sound is--------------- ---------------------------------- --------sound	-Appreciation	
		4	-What is this quality-------- ---------------------------------- -------chapter	-Curiosity	
	8.1		**-(How sound is produced)**		
		5	**-(Activity 1)**		
			-Does the sound------------ band?	-Quest for knowledge	
		6	**-(Activity 2)**		
			-Does your palm------------- ---------------------------------- ----anything	--do-	
64		8	**-(Activity 3)**		
			-Can you see----------------- ---------------------------------- -----the ball	-do-	
		9	**-(Answer these)**		
			-Question No.1-------------- ------	-do-	
	8.2		**-(Vibrations or Oscillations)**		
65		15	-(Answer these)		
			-Question No.3-------------- -------	-Systematic Reasoning	

	8.3		**-(Loudness and Pitch)**		
66		22	**-(Activity 4)**		
			-How does the pitch---band?	-Quest for knowledge	
		23	**-(Activity 5)**		
			-Take a metal tumbler--case	-do-	
		24	-The Indian musical Instrument------------------------------------activity	-Appreciation (of knowledge)	-Indigenous information is provided
66-67		25-26 (box)	**-(Musical Instruments)**		
			-Music is the arrangement---examples	-Quest for knowledge	
			-In India------------------ examples	-Appreciation (of knowledge) -Cultural heritage	-Indigenous information is given
68		27	**-(Activity 6)**		
			-What happens to--sound?	-Quest for knowledge	
			-why do you------------- changes?	-Curiosity	
		28	-Loud sound can cause---------------------------------------vibrations	-Objectivity	
		30	-Some animals like dogs---------------------------------------hearing	-Appreciation (of nature)	

		32	-Our ears are delicate----------deaf	-Appreciation (of knowledge)	-Knowledge related to human body and care.
69		33 (box)	-It is good that--movements	-do-	
	8.4		**-(Sound Needs a Medium to be Heard)**		
69-70		35	-That is, a medium is--travel	-Precision	
		36	**-(Activity 7)**		
			-Ask your friend--------------gently	-Team spirit	
		37	-You can check---sound?	-Verification	
			-Now do the same---situations	-Quest for knowledge	
		38,39,40 (box)	-That sound needs--whales	-do-	
70-71		41	**-(Activity 8)**		
			-You can now---------------end	-Team spirit	
71		42	-That sound can be--matter	-Appreciation (of knowledge)	

		43	-**(Answer these)**		
			-Question No.2--------------	-Systematic Reasoning	
			-Question No.3-------------	-do-	
	8.5		-**(Reflection of Sound)**		
72		47	-What will happen---------- ----------------------------------- --------two?	-Curiosity	
		48	-The human ear-------------- ----------------------------------- -------sound	-Systematic Reasoning	
		49	-The reflection of sound---- ----------------------------------- --------ocean	-Appreciation (of knowledge)	
73		52,53,54, 55(box)	-There are amongst us------- ----------------------------------- --------mute	-Compassion	
			-Even with this great-------- ----------------------------------- -----------life	-Appreciation (of courage)	-Achievement of courageous and strong minded deaf and mute
			-Hellen Keller,one---------- ----------------------------------- ---------singer	-do-	-Achievement of deaf and mute
			-Try and visit one----------- ----------------------------------- -----------too	-Compassion	
		54-55	-**(The sounds of Music)**		

			-Regular vibrations--noise	-Objectivity	
74		56-57 (box)	-Notice that the--effect	-Appreciation of knowledge	
			-Sounds produced by--loudness	-Objectivity	
		58	**-(Answer these)**		
			-Question No.3-------------------	-Systematic Reasoning	
75		59	**-(You Now Know)**----------		
			--Sound is----------second	-Precision	Summary
		60	**-(Now Answer these)**		
			-Question No.2----------------------	-Quest for knowledge	
			-Question No.4---------------------	-Systematic Reasoning	
			-Question No.5---------------------	--do-	

Chapter : Nine
Title : Electric Changes at Rest

Page	Section	Para	Content	Value	Remarks
76		1	-Such an observation--------------ago	-Appreciation (of scientist's contribution)	
	9.1		**-(Positive and Negative charges)**		
		4	-Can all bodies--------extent ?	-Curiosity	
77		11	-Thus we may conclude -------------each other	-Precision	
		13	-When we rub two--------------charges	-do-	
	9.2		**-(Charging by Contact and the Electroscope)**		
		15	-But is this the ------------body ?	-Curiosity	
79		18	-You can satisfy yourself----------activity	-Verification	-Emphasis on checking the fact
		20	-Why did the paper-----------rod ?	-Curiosity	
			-By contacting it-----------------diverged	-Systematic Reasonings	
79-80		21	-The more the charge---------leaf	-Precision	

80		22	**-(Answer these)**		
			-Question No.1----------------	-Systematic Reasoning	
			-Question No.2------------	-do-	
	9.3		**-(Making Charges Flow)**		
80-81		25	-Metals differ in------------------charges	-Objectivity	
			-Metals are excellent----------conductors	-Appreciation (of knowledge)	
			-You can easily test-------------fold up !	-Verification	-fact can be tested
81		26	**-(Answer these)**		
			-Question No.3------------------	-Systematic Reasoning	
	9.4		**-(Electricity in the sky)**		
		27	-Large amounts of--------------thunderstorm	-Appreciation (of Nature)	
			-What can happen-------------------other ?	-Curiosity	
81-82		29	-You should not stand------------- human body	-Appreciation (of knowledge)	-Information is related to safety of life
82		30	-That lightning is electric---------the key	-do-	-Contribution of scientist which also inspires students to be inquisitive and explorative

		31	-Franklin went further------------- buildings	-do-	-Contribution of scientist and its utility in life
		32(box)	-Franklin was a ------ ---------see better	-do-	-Useful contributions of a scientist
			-(You Now Know)-- ---------------		
			-Rubbing--------- conductors	-Precision	
			-(Now Answer These)		
		33	-Question No.1------- ------	-Systematic Reasoning	-Direct answers are given in the text.
		34	Question No.3-------- -	-Systematic Reasoning	"

Chapter : Ten
Title: Energy

Page	Section	Para	Content	Value	Remarks
83	10.1		-**(Mechanical Energy)**		
		2	-Therefore,a moving----------------- ---------------------------energy	-Precision	
84		5	-The total mechanical----------------- --------------------------energy	-Precision	
84-85		8	-**(Answer These)**		
			-Question No.2---------------------	-Quest for knowledge	
			-Question No.3---------------------	-do-	
			-Question No.4---------------------	-do-	
			-Question No.5---------------------	-do-	
85	10.2		-**(Transformation of Energy)**		
			-These examples show--------------- -----------------------another	-Precision	
		9	-How does it do so ?--------------	-Curiosity	
85-86		12	-Whenever mechanical--------------- -------------------------friction	Appreciation (of knowledge	-Application to things of use.
86		13	-See how convenient----------------- -----------------------sound	Appreciation (of knowledge)	
		14	-We thus see that--------------------- ------------------------efficiency	-Precision	
		15	-There is an important--------------- ------------------transformation	Appreciation (of	

				knowledge)	
		16	-This means that--same	-Precision	
		17	-**(Answer these)**		
			-Question No.2--------------------	-Systematic Reasoning	
			-Question No.3----------------------	-Quest for knowledge	
			-Question No.4---------------------	-do-	
	10.3		-**(Judicious Use of Energy)**		
86-87		18	-For each of his activities--------------------------------------vehicles	Appreciation (of knowledge)	
87		19	-The population has--decreasing	-Objectivity	
87-88		22	-We,therefore,need to--can	Appreciation (of knowledge)	
88		23	-How can we do this?-------------	-Curiosity	
			-Firstly, we must reduce-----------------------------------resources	Appreciation (of knowledge)	
			-Or,can we use water---electricity	-Curiosity -Quest for knowledge	
		24	-Secondly,we must look---------------------------------------sources	Appreciation (of knowledge)	
			-Rather than using coal--factory?	-Curiosity -Quest for knowledge	

			-One successful method--water	Appreciation (of knowledge)
88-89		25	-Thirdly,we must--sun	Appreciation (of knowledge)
			-The sun is a perennial---free !	Appreciation (of Nature)
			-If we could device---done	Appreciation (of knowledge)
88		26-27 (box)	-Energy is like money!---resource !	-Systematic Reasoning
89		28	-A forest is a great---products	Appreciation (of knowledge)
			-If only we could---problems !	-Quest for knowledge
		29	-**(Answer these)**	
			-Question No.3----------------------	-Systematic Reasoning
		30	-**(You Now Know)**---------------	
			-A moving -----------conserved	-Precision
89-90		31	-**(Now Answer These)**	
			-Question No.3--------------------	-Systematic Reasoning

Chapter :Eleven
Title: Water

Page	Section	Para	Content	Value	Remarks
91		1	-Water has some-------------------------------substance	-Appreciation (of Nature)	
			-Some of these properties-------------------------- life	-do-	
			-Unfortunately,---------------------------------health	-Objectivity	
	11.1		**-(The water Molecule is H_2O)**		
		2	-In fact, one has to-------------------------------O_2	--do-	
92		6	-This teacher ---------------------------------oxygen-	-Verification	
	11.2		**-(Some Interesting Physical Properties of Water)**		
93		9	-Usually, the density---------------------------activity	-Objectivity	
			-But with water------------------------------activity	-Verification	

		12	-Solid water or ice---------- ----------------------water	-Verification	
			-It means that for------------ -----------------freezing	-Systematic Reasoning	
		14	-The lower density of------- --------------------lakes	-Objectivity	
			-The coat action is another- ------------ ------------death	-Appreciation (of knowledge)	
93-94		15	-another useful property---- ------------------------faster	-do-	
94		16	-A nice use of-------------- ---------------------coolers	-do-	
		17	-We can see this------------- -------------------activity	-Verification	
			-(**Activity 2**)		
		18	-This activity shows that--- -------------------------water	-do-	
94-95		19	-All holding hands---------- ----------loose arrangement	-Objectivity	
			-Very cool water is---------- --------------------4^{0}c	Appreciation (of knowledge)	

95		20	**-(Answer these)**		
			-Question No.1-----------	-Quest for knowledge	
	11.3		**-(Water Attacks Metals)**		
		21	-Metals such as sodium-----------------temperature	-Appreciation (of process)	
95-96		24	-Magnesium metal is-------------------------solution	-Objectivity	
96		25	-Prevention of rusting-----------------------paints	-Appreciation (of knowledge)	
			-(Answer these)		
		26	-Question No.2----------	-Systematic Reasoning	-Answer is given in the text.
	11.4		**-(Water Dissolves Many Substances)**		
		29	-It is only through the--------------------------Oxygen	-Appreciation (of beauty of nature)	
		30	-The following activity---------------------------in it	-Verification	
97		31,32	**-(Activity 4)**		

		32	-This activity demonstrates---gages-	-Verification	
			-This property is---------------------------------------life	-Appreciation (of knowledge)	
			-The water in the-----------------------------die	-Systematic Reasoning	
		34	-In Gujarat and Rajasthan----------problem	-Objectivity	-Indigenous information is provided.
		35	-Rivers bring water-----------------------------salinity	-Systematic Reasoning	
		36	-Sea water is not---------------------------------water	-Appreciation (of knowledge) -Objectivity	
97-98		38	-This activity shows that----------------------them	-do-	
98		39	-The distilled water-----------------------------bodies	-Objectivity	
		40	-The hardness of water------------------------water	-Systematic Reasoning	
		41	-Like saline water, hard-------------------------boiler	-do-	
	11.5		**-(The Presence of Unwanted Material Makes Water Polluted)**		
98-99		43	-Water is most---------------------------------beings	-Appreciation (of nature)	

			-Yet, in many--world	-Objectivity	
99		47	-In order to prevent pollution------------rivers	-Protection of Environment	-Emphasis on preventive measures is given.
99-100		48	-See how useful-----------------------------popular	-Appreciation (of knowledge)	-Appreciation of process and products of science
100		50	-What are some of-------------------------------use ?	-Curiosity	-Too many questions to answer. The last question on making water safe could be separated from the initial questions and asked before attempting its answer.
101		51	-Control and removal-------------------environment	-Protection of environment (improvement measures)	
			-One such example is the ganga Purifaction Project-------------------environment	-Appreciation	-Indigenous information is provided.
		53	**-(You Now Know)-------** -Liquid water---------practices	-Precision	Summary
		54	**-(Now Answer These)**		
			-Question No.4------------	-Quest for knowledge	

Chapter :Twelve
Title: Air

Page	Section	Para	Content	Value	Remarks
102		1	-Air is everywhere------------------------------earth	-Appreciation (of nature)	
			-All living things need air--------------------------	-do-	
	12.1		**-(Air is a Mixture)**		
		3	-Nitrogen is the--------------------------------air	-Appreciation (of knowledge)	
		6	-Air always contains------------------------vapour	-do-	
103-104		11	**-(Answer these)**		
			-Question No.2---------	-Curiosity -Quest for knowledge	
103		12 (Box)	-Wind is thus caused---------------------------air	-Precision	-Concluding statement
			-The larger the pressure------------winds	-do-	
104-105	12.2		**-(Constituents of Air and their Uses)**		

		14-15 (Box)	-Has the composition------- -----------------same ?	-Curiosity	
			-There was no Oxygen----- ------------atmosphere	-Appreciation (of knowledge)	-Information is interesting also.
			-Thus, the atmospheric----- ---------------------years	-do-	
			-We still have many-------- ---------------------today!	-Appreciation (of knowledge)	
105		17	-When these are used------- -----------------well	-do-	
106		20	-This can be seen------------ -----------------activity	-Verification	
		21	-**(Activity 1)**		
			-The gas can be tested----- ------------------oxygen	-do-	
106-107		23	-Oxygen is essential-------- ---------------------fuels	-Appreciation (of knowledge)	-Usefulness in life and industry
107		24	-Nitrogen compounds are-- -----------------drugs	-do-	
		25	-Carbon dioxide is used---- ---------------------works	-do-	

107-108		26	-It is used to keep---------- ------------------frozen	-do-	
		27	-Argon is used for---------- --------------------bulbs	-do-	
		28	-Helium is used------------ -----------------tubes	-do-	
	12.3		**-(Air Pollution)**		
		30	-Pollutants are harmful----- -----------------both!	-Objectivity	
		31	-Such auto exhaust--------- ------------------pollution	-Appreciation (of knowledge)	-Awareness
		32	-Proper ventilation--------- ----------------essential	--do-	
		34	-In refineries and ---------- ------------------organisms	-do-	
		35	-Hence special precautions---------------- ------------------refinery	-Protection of Environment	-emphasis on measures
		37	**-(Answer these)**		
			-Question No.1----------	-Systematic Reasoning	
		38	**-(You Now Know)**		
			-Air is---------avoided	-Precision	
		39	**-(Now Answer these)** -Question No.1-----------	-Systematic Reasoning	

Chapter-Thirteen

Title: Organization of the Living Body

Page	Section	Para	Content	Value	Remarks
110		1	-The living world has ---------------------structures	-Appreciation (of beauty of nature)	-Variety in nature
			-They all look different--------------------------alive	-Unity in diversity	
		2	-Their structures are-----------------------------task	-Systematic Reasoning	
110-111		3	-How does a multicellular-----------------performance?	-Curiosity	
111	13.1		**-(Organisation of Multicellular Organisms)**		
		4	-We thus have -----------------------organisation	-Precision	
		5	-Similarly all the organs---------------------------alive	-Appreciation (of knowledge)	
111-112		6	-Similarly, the tissues-----------------------function	-do-	
112		7	-We know that the cell-----------------------feature	-Appreciation (of knowledge)	

		9	**-(Activity 1)**		
			-Can you compare--------------------------body ?	-Curiosity -Quest for knowledge	
		11	**-(Answer these)**		
			-Question No.2----------	-Systematic Reasoning	
113	**13.2**		**-(Cells)**		
		12	-A bacterium,a banana -----------------------cells	-Unity in diversity	
			-Cell is the smallest---------------------------function	-Appreciation (of knowledge)	-Repetition as already stated in para 7.
113-114		15	-Figure 13.2 (b,c,d&e) shows-----------function	-Appreciation (of knowledge)	
114		16	-Cell sizes can also vary a lot---------------------	-do-	
		18	-How does a small plant------------------cat?	-Curiosity	
			-Some cells in our body-------------------------age	-Objectivity	
		19	-So they have special-------------------------around	-Appreciation (of Nature)	
115		21	**-(Activity 2)**		

			(i)-Note down the shapes-------organisms	-Honesty and Truthfulness	
			-Observe a drop of-------------------------swim ?	-Quest for knowledge	
			(ii)-Observe the drop-------------------------also	-do-	
			-Note down if you---------------------------also	-Honesty and Truthfulness	
115-116		22	-**(Answer these)**		
			-Question No.2-----------	-Systematic Reasoning	
116	13.3		-**(Tissues)**		
117		27	-This tissue protects-----------------------------soil	-Appreciation (of knowledge)	
		28	-**(Activity 3)**		
			-Observe the seedings------------------------roots	-Quest for knowledge	-This may inspire students to undertake the activity and explore further.
118		29	-**(Activity 4)**		
			(i)-Take a fresh carrot---------------------cylinder	--do-	-do-
			(ii)Take a small branch---------------------flowers	-Quest for knowledge	-do-

		32	-**(Activity 5)**		
			-Take a thin section---------------bundles(fig13.7d)	-do-	-do-
		34	-This arrangement of cells-----------------sweat	-Appreciation (of knowledge)	
119-120		35	-The cells can contract-------------------expansions	-do-	
120		37	-This feature is absent--------------------------other	-Objectivity	
121		40	-**(You Now Know)**-------		
			-Most living---------these	-Precision	
121-122		41	-**(Now answer These)**		
			-Question No.4---------	-Quest for knowledge	
			-Question No.5-----------	-Systematic Reasoning	

Chapter : Fourteen
Title: Life Processes-I

Page	Section	Para	Content	Value	Remarks
123		1	-We know that all----------- ------------------alive	-Unity in diversity	
			-Reaction to stimuli--------- --------------manner	-Appreciation (of knowledge)	
			-Growth and Reproduction---------------- -------------------kinds	-do-	
	14.1		**-(Energy is Needed for the life processes)**		
		2	-Living organisms----------- -------------processes	-do-	
	14.2		**-(Modes of Procuring Food)**		
			-(Activity 1)		
124-125		5,6,7	-Teacher Demonstration -Take any potted plant------ -----photosynthesis	-Systematic Reasoning	-If two sentences like 'let us verify it' or 'we can prove it' are added , the demonstration could be used for emphasizing value of 'verification' as well.

126		8-9	-(Activity 2)		
			-Note : You will------------------photo synthesis	-Systematic Reasoning	
		10	-If you list all------------------------------animals	-Appreciation (of Nature)	-Interdependence of plants and animals.
			-Do you know even plants-------------insects	-Curiosity -Appreciation	
			-Fig.14.3 shows how-------------------------------plants(including figure)	-Appreciation (of knowledge)	-Male figure is given
126-128		11	-There are special-------------------------food in(including figure 14.4)	-Appreciation (of Nature)	
			-You can see how many-------------food	-Quest for knowledge	
			-(Activity 3)		
128		12	-Watch and note down-------------lizard	-do- -Honesty and Truthfulness	
			-(Activity 4)		
		13	-List all animals you see------------omnivores	-do-	

	14.3		**-(Different Steps in the Process of Nutriton)**		
130	14.4		**-(Respiration)**		
		19 (Box)	**-(How do we get Oxygen Continuously ?)**	-Curiosity	-Title itself creates interest and need to know.
			-If Oxygen gets used---------------------------- replenished?	-do—	
			-So photosynthesis in plants-----------survival	Appreciation (of knowledge)	-Interdependence is also appreciated.
130-131		20	-Can you do that------------------------during ?	-Curiosity	-In the next sentence, After "you can not"use of 'why' could help emphasise reasoning.
			-Fishes and many------------------------------gill	-Appreciation (of Nature)	
131		21	-In humans several---------------------respiration	--do-	
			-Have you noticed-----------------------and out?	-Curiosity	
			-(Activity 5)		

		23	-Count how many times-----------exercise	-Honesty and Truthfulness	
			-Compare you results-------------------friends	-Team spirit	
132		25	-Does it seem similar-------------Table 14.1 (including table)	-Quest for knowledge	
		27	-So many people------------------------------------ respiration(Suffocation)	-Courage to Question	-Logical reason is given
133		28 (Box)	-Look at figure 14.7---------photosynthesis(including figure)	Appreciation(Interdependence)	
			-Why does this happen----------------------------------- -photosynthesis	-Systematic Reasoning	
	14.5		**-(Transport of Materials Inside the Body)**		
134-135		36	-This is what we eat----------------------------carrots	-Appreciation (of Nature)	-Products of Nature
135		37	-You can feel the----------------------------------fingers	-Verification	
			-This is how the------------------------------------- pulse	-Appreciation (of Knowledge)	

136		39	-It also helps in the-------------------------------wound	-do-	
			-It also plays a role------------------------------germs	-do-	
136-137		40.	-Blood is a very vital---------------------------transfusion	-do-	
			-Therefore, we must---------------------------emergency	-do-	
137		41	**-(Activity 7)**		
			-When you press--red	-Systematic Reasoning	
	14.6		**-(Removal of water Products (Excretion))**		
138		46	-Waste removal is------------------------------------sick	-Appreciation (of Knowledge)	-Male figure is given
		47	-Sometimes when you-------------------------------helps	-do-	
		48	-some of the plant secretions-----------villages	-do-	
139	14.7		**-(Reaction to stimuli and co-ordination)**		

		50	-But all these parts--------- -------------------respiration	-Appreciation(of knowledge)	
			-Can you guess------------- ---------------------------fails	-Curiosity	
			-So all life processes-------- -------------------------- Occur	-Appreciation (of knowledge)	
		51	-Reaction to stimuli is------ ---------------------- reactions	-Appreciation (of Nature)	
140		53	-But how does the----------- ----------------information?	-Curiosity	
			-So when you see------------ -----------------------brain	-Appreciation(of knowledge)	
141		Fig. 14.14	-Endocrine system in Men and in Women	-Gender Equality	-Both male and female figures are shown along with sex differences
142		56	-**(Activity 8)**		
			-Do you think that----------- -------------------------right	-Systematic Reasoning	
	14.8		-**(Locomotion (Movement))**		
142-143		59	-The major difference------ ------------------------move	-Appreciation(of knowledge)	
			-How does a train move?---	-Curiosity	

144			-First it should have--------- ---------------------------- move	-systematic Reasoning	
			-Just imagine how----------- -----------------------finger!	-Curiosity and -Quest for knowledge	
		60	-So movement of the-------- ---------------------animals	-Appreciation (of Knowledge)	
		61	-We use legs to------------- -------------------------this	-Appreciation (of Nature)	
		62	-There are more than------- ---------------------walking	-do-	
		63	-The amoeba extends------- ---------------environment	-do-	
		64	**-(Activity 10)** -Collect some water--------- -------------------observe	 -Honesty and Truthfulness	
		65	**-(Activity 11)** -Sit quietly on your--------- ---------------------------- you	 -Curiosity -Quest for knowledge	
		66	**-(Activity 12)** -Notice that the hydra------ ---------------------"Walk"	 -Appreciation (of Nature)	

144-145		67	-You must have------------------------------------dusk	-do-	
145		68	-They all do that------------------------------------winter	-Reasoning	
		69	-**(Activity 13)**		
			-If you see a line------------------------------------again ?	-Curiosity	
		70 (box)	-**(How Do You Know Bees Inform Others where the Food is Available ?)**	-Curiosity	-Title raises curiosity
			-The worker bee after------------------------------society	-Appreciation (of nature) -Quest for knowledge	
146		72	-**(Now You Know)**-		
			-All organisms---------movement	-Precision	
			-**(Now Answer These)**		
146-147		73	-Question No.9--------------	-Systematic Reasoning	
			-Question No.19------------	-do-	

Chapter : Fifteen
Title: Life Processes-II

Page	Section	Para	Content	Value	Remarks
148		1	-One of the most------------------------------------reproduce	-Appreciation (of nature)	-Life Processes
		2	-There are many ways---------------------------groups	-do-	
			-Most sexually reproducing-------------------------purpose	-do-	
	15.1		**-(Asexual reproduction)**		
148-149		4	-This is how a colony---------------------------formed	-do-	
150		6	-Have you noticed------------------------------------from?	-Curiosity	-About natural things/ observations
151		9	**-(Activity 2)**		
			-Keep a record of------------------------------------develop	-Honesty and Truthfulness -Quest for Knowledge	
			-(Activity 3)		
		10	-Watch the roots-------------------------------growing	-do-	
			-This vegetative method---------------------------plants	-Appreciation (of Knowledge)	
151	**15.2**		**-(Sexual Reproduction)**		
151-152		13	-There are various ways--------------------these cells	-Appreciation (of nature)	

		15	-All the beautiful colours----------------------------------cells	-Appreciation (of knowledge and nature)	
		16	-The process of these cells--------------pollination	-Appreciation (of nature)	
153		19	-This is how the species continue	-do-	
		20	**-(Activity 5)**		
153-154			-Note down all the parts------------------------------up ?	-Honesty and Truthfulness	
154	**15.3**		**-(Growth and Development)**	-Quest for Knowledge	
		23	-But they do grow----------------------------------same	-Appreciation (of Nature)	
156		28 (box)	**-(How Do You Know the Age of a Tree ?)**	-Curiosity	-Title creates curiosity
			-Since only one ring -------------------------------tree	-Systematic Reasoning	
156-158		30	-There are a variety----------------------------------adults	-Appreciation (of nature)	
			-If you look carefully-----------------------------adults	-Quest for knowledge	-Students may like to explore further.
158		31	-An adult human being------------------------------way	-Appreciation (of nature)	
			-Is it not amazing--------------------------------happens ?	-curiosity	
			-Some of the details--------------------------------happens	-Perseverence	

		32	**-(Activity 6)**		
			-Plant a maize seed------------ ------------------------out	-Honesty and Truthfulness	
				-Quest for knowledge	
		33	**-(Activity 7)**		
			-Take the height and---------- ---------------------adults	-Quest for knowledge	
		34	**-(Activity 8)** -Measure the length ---------- ---------larger	-Quest for knowledge	-The information in the activity has no link with above description. It is required to be linked through few lines in the beginning that some organs stop growing in size early in comparision to other organs etc,.
		35	**-(Activity 9)**		
			-Collect a caterpillar from---- -------------------body	-Quest for knowledge	
			-Then observe its development-----------body	-Honesty and Truthfulness	
158-159		37	**-(You Now Know)**		
			-Living organisms---------development	-Precision	
159-160		38	**-(Now answer These)**		
			-Question No.1-----------	-Systematic Reasoning	

Chapter : Sixteen
Title : Food

Page	Section	Para	Content	Value	Remarks
161		1	-Food is the fuel-------------car	-Appreciation (of knowledge)	
162	**16.1**		**-(The Body is Different from the Usual Machines)**		
		2	-There are many-------------table 16.1. (including Table 16.1 page 161)	-Quest for knowledge	
		3	**-(Answer these)**		
			-Question No.1-------------	-Curiosity -Quest for knowledge	
			-Question No.2-------------	-do-	
			-Question No.3-------------	-do-	
			Question No.4	-do-	
	16.2		**-(Food has many components)**		
		4	-Food is essential-------------healthy	-Appreciation (of knowledge)	
			-Yet the substance---------carbohydrates	-do-	
162		6	-The main carbohydrate-------------starch	-do-	

			-Its energy content-------------molecule	-Appreciation (of knowledge)	
			-Table 16.2 shows----------------activities (including Table 16.2, page 163)	-do-	
163			-This is why we use-----------we eat (including table 16.3)	-do-	
		7	**-(Activity 1 : Test for carbohydrates)**		
			-Potato and rice contain------------potato	-Verification	
		8	-Fats are thus like--------------------use	-Appreciation (of Nature)	
		9	-Fats are important ----------fats	-Appreciation (of knowledge)	
164		10(Box)	**-(Polar Bear)**		
			-The polar bear in Canada-------------people	-Appreciation (of Nature) -Quest for knowledge	
		11	**-(Activity 2 : Test for Fats)**		
			-Here is a very simple -------------------oil	Verification	
			-You can do----------------oil	-Quest for knowledge	
		12	-Some proteins help in---------rich in proteins	-Appreciation (of knowledge)	
164-165		12-14	**-(Teacher Demonstration) Test for Proteins**	-Verification (Scope for the value)	-The procedure in Teacher

					demonstration requires the students to observe the change in colour of egg white but no where if indicates how it is test for proteins
165-166		16	-But we must ---------these	-Appreciation (of knowledge)	-Information is relevant to health
			-Carrots, butter------------ vitamin A	-Appreciation (of knowledge)	-Vitamins' role and their availability
			-Vitamin C helps--------- infection	-do-	
166		17	**-(Activity 3)-Test for vitamin C**		
			-This is an excellent----------------vitamin C	-Verification -Appreciation (of Processes)	
			-You can try this-------------juices also	-Quest for knowledge	
		18	-Water is the essence of life	-Appreciation (of Nature)	
			-In fact 60-70% --------------it has !	-Appreciation (of knowledge)	
167		19,20	**-(Activity 4)-Water content in Food Material)**		

			-Take one grape------------- --successfully	-Systematic Reasoning -Quest for knowledge	
		18	-See how many-------------- ---the grape	-Curiosity	
			-Using the balance--------- in weight	-do-	
			-Prepare a Table------------ below	-Honesty and Truthfulness	
		19	-Can you calculate---------- -----item	-Curiosity	
167-168		21	**-(Activity 5)**		
			-You can use the balance-- -------fresh potato	-Systematic Reasoning	
			-(Answer these)		
			Question No.4------------	-Systematic Reasoning	
168	**16.3**	22	**-(Diet that you eat should be balanced)**		
168-169		23	-Each component is-------- --body	-Appreciation (of knowledge)	
			-Each component is-------- -diet ?	-Curiosity	
			-(Table 16.4) Components of Food	-Precision	
			-This is answered----------- ---body (including table 16.5)	-do- Gender -Equality	-Table provides information about recommended

					daily balanced diet for both by and girl
169-170		25	-Table 16.6 gives the ------ -----------the body (including table 16.6)	-Appreciation (of knowledge) -Precision	
170	**16.4**		**-(Value of some Everyday food items and food fads)**		
		27	-These cereals give us------ --------amount	-Appreciation (of knowledge)	-Appreciation of value of some foods
			It is important------------ system	-do-	
		28	-It comes in many --------- energy	-do-	
		29	-It is an expensive-------- season	-do-	
			-Yet many people think---- ---------why ?	-Curiosity	
			-Just because it is---------- --statements	-Courage to question	Incorrect thinking related to food fads is pointed out stating that it has no scientific base
			-There is no scientific ----- ----------statements	-Objectivity	
170-171		30	-How did such food------- --------about ?	-Curiosity	

			-Firstly, lack of knowledge---------------grapes	-Systematic Reasoning	
			-You just saw---------------------------------grapes	-Courage to Question	
171		31	**-(Activity 6)**		
			-Make a list of----------------------fad	-Quest for knowledge -Honesty and Truthfulness -Systematic Reasoning	-Students have to explore the information and give reasons
171-172		32	**-(You Now Know)**		
			-The body-------------superstitions	-Precision	
171-172		34,35 (Box)	**-(Our Responsibility)**	Responsibility	-Title directly emphasizes the value
			-Can we help---------------------------problem ?	-Curiosity	
			-Here are some ways-------------increase	Responsibility -Appreciation (of knowledge)	
			-We should do our----------------increase	-Observation of small family norm	-Emphasis on check on population growth is given
172		35	-If you observe carefully-----------------things	-Quest for knowledge -Appreciation (of knowledge)	

Chapter : Seventeen
Title : Health and Diseases

Page	Section	Para	Content	Value	Remarks
173		1	-Therefore, when we want -------------hygienic	-Appreciation (of knowledge)	
	17.1		**-(Good Health Needs the Right Type of Food)**		
		2	-We have seen------------------------------health	-do-	
			-Each of these-----------------------------role	-do-	
174	**17.2**		**-(Deficiency of Carbohydrates)**		
		7	-This is excellent practice---------------eat	-do-	
		8	-We know that----------- organs	-do-	
174-175		10	-But they are-----------------------reasons	-do-	
175-176		11	In Table 17.2 we -------------diseases (including Table 17.2)	-Precision -Appreciation (of knowledge)	
176		12	-Thus, vitamin----------------------------cured	-Appreciation (of knowledge)	
		14	-Calcium is thus-------------------mineral	-do-	
		15	-Where is calcium-----------------diet	-Curiosity	
176-178		16	-Another important----------------diet	-Appreciation (of knowledge)	

178		18	-Table 17.3 lists------------- ---------------diet (including Table 17.3)	-Quest for knowledge -Precision	
		20	**-(Answer these)**		
			-Question No.1---------	Honesty and Truthfulness	
			-Question No.2--------	-Quest for knowledge	
			-Question No.3--------	-Systematic Reasoning	
	17.3		**-(Preparation of Food)**		
		21	-There are over 50 --------- --------------more !	-Appreciation (of knowledge) -Quest for knowledge	-Indigenous information is provided
178-179		23	-How can we prevent------- ------contamination?	-Curiosity	
			-Cleaning of rice------------ ---------------jellies to keep them from spoiling	Appreciation (of knowledge)	-Information is useful in daily life also.
178			-Food kept in closed-------- ----------why ?	-Curiosity	
179			-The scientist Louis Pasteaur-------------dairies	-Appreciation (contribution of scientist)	
		24	**-(Answer these)**		
			-Question No.1-------------	-Quest for knowledge	-All the three questions require students to observe, explore various food
			-Question No.2-------------	-do-	
			-Question No.3-------------	-do-	

					items and find further information
179-180		27	-So what should one do ?	-Curiosity	
180		28	-What makes the----------------------use ?	-do-	
181		30	-Earthen pots are-----------------------------cool	-Appreciation (of knowledge)	
		31	-See Figure 17.3--------------------------place	-Curiosity	
181-182		34	-What does this---------------------diseases ?	-Verification	-Like other activities no where it is stated that the students can verify the information through the activity. If a line is given before beginning the activity, it will emphasise verification directly.
182		36	-To fight these disease-----------------------substances	-Systematic Reasoning	
		37	-The best way to---------cleanliness	-Appreciation of knowledge	-The paragraph also emphasizes students' participation

			-If we do not------------our part	-Social Responsibility – Cleanliness	in maintaining cleanliness
		38	-But just look around----------------environment clean	-Cleanliness -Responsibility	-The paragraph also emphasizes students participation in maintaining cleanliness
		39	**-(Answer these)**		
			-Question No.3	-Quest for knowledge	
		40	**-(You Now Know)**		
			-Insufficient ----------water	-Precision	
183		41	**-(Now answer these)**		
			Question No.1	-Systematic Reasoning -Quest for knowledge	

Chapter : Eighteen
Title : Soil

Page	Section	Para	Content	Value	Remarks
184		1	-Have you wondered-- ------------------way?	-Curiosity	
		2	-Stormy winds--------- -------------------dust	-Appreciation (of knowledge)	
		3	-We shall study-------- ------------------earth	-Curiosity	
	18.1		**-(Contents and Types of Soil)**		
		4	-Soil is an--------------- ---------------animals	-Appreciation (of nature)	
		5	-It enables us----------- --------------------earth	-Appreciation (of knowledge)	
184-185		7	**-(Activity 1)**		
		(a)	-Observe the soil------ ---------------many ?	-Quest for knowledge -Curiosity	
		(b)	-Observe these layers- ----------------organism	-Quest for knowledge	
185		(c)	-Scratch or Scoop----- ----------------texture	-Quest for knowledge	
		(d)	-Scoop out a little------ --------------texture ?	-do-	

		(e)	-Pour a little water-------------------soaked?	-do-	
		(f)	-Collect some sample-----------------------below	-do-	
			-Record the colour-----------------------layer	-Honesty & Truthfulness	
		8	-The humans makes-----------------nutrients	-Appreciation (of knowledge)	
		11	**-(Activity 2)**		
		(a)	-Weigh this portion--------------------weight	-Honesty and Truthfulness	
		(b)	-Why is it different ?	-Curiosity -Quest for knowledge	
		(c)	-What does this tell you?	-Curiosity -Quest for knowledge	
		12	-Let us see--------------------------------other	-Curiosity	
185 186		13	**-(Activity 13)**		
		(b)	-Take the same---------------------Activity 2	-Quest for knowledge	
			-Note colour-----------------------------texture	-Honesty and Truthfulness	
186		(f)	-Record your observations-----------------------------table	-Honesty and Truthfulness-	
			-You will find that-------------------------size	-Verification	

		16	-Figure 18.1 shows---- ---------------------------- red latosol (including figure 18.1 (Page 187)	- Appreciation (Indigenious information/knowledge)
		17	-The black soil area--- ---------------sugercane	-do-
			-Moving a little further----------top soil	-do-
188		18	-The plains of Haryana--------content	-do-
		19	-This point has been--- --------------Rajasthan	-do-
		20	-They vary in their---- -------------------forests	-do-
		21	**-(Answer these)**	
			-Question No.1--------	-Systematic Reasoning -Quest for knowledge
			-Question No.2--------	-Systematic Reasoning
	18.2		**-(How Soil is Formed)**	
191		25	-Water also plays------ ------------------pieces	-Appreciation (of knowledge)
			-Remember the unusual-----------water	-do-

		26	-Figure 18.3 shows-----------------------life of the soil (including fig.18.3)	-Precision	
			-You will now appreciate--return	-Appreciation (of nature)	
	18.3		**-(Soil as a Resource)**		
		27	-Have you seen how-----------------greenery?	-do-	
			-Soil is thus a vital-------------------------------world	-Appreciation (of nature)	
			-Most of our primary--------------------sheds	-Appreciation (of Knowledge)	
		28	-Without the soil------------------------underground	-Appreciation (of knowledge)	
		29	-They absorb substantial-----------------------------animals	-do-	
191-192		30	-Do you now-----------------------conserve it	-do-	
			-You can appreciate-----------------------------below	-Verification	
192		31	**-(Activity 4)**		

			-Which one loses------ ---------------------- blowing?	-Systematic Reasoning	
		32	-**(Activity 5)**		
			-which tray loses------ -----------------wash?	-do-	
		33	-These activities will slow------------rapidly	-Verification	
			-These activities will-- -------------------zone	-Systematic Reasoning	
			-What are these?-------	-Curiosity	
			-A large number of trees--------population	-Systematic Reasoning	
		34	-You can add---------- --------------------list	-Quest for knowledge	
		35	-What are the---------- ----------------erosion?	-Curiosity	
		36	-**(Answer these)**		
			-Question No,.2-------- ----	-Quest for knowledge	-Information not provided in the text.
192-193		37	-**(You Now Know)**		
			-Soil is--------- vegetation	-Precision	
			-**(Now Answer these)**		
			-Question No.2-------	-Systematic Reasoning	
			-Question No.4-------	-do-	

Class VIII

Chapter-One
Title : Carbon

Page	Section	Para	Content	Value	Remarks
	1.1		**-(Graphite and Diamonds)**		
1-2		2	Inspite of ---fractures easily.	-Appreciation	
			-A beam of light --------------------------------beautiful colours.	-do-	
2		3	-It is this property--------------------------------good lubricant.	-do-	
		4	-It is this highly stable structure -------------------------wide variety of uses.	-do-	
3		9	-It is, therefore, a conductor of electricity.	-do-	
			-How, diamond is an ---------------------of heat.	-do-	
3-4		10	-Graphite being-----------------------------temperature are involved.	-do-	
			-In India,, graphite--------------------------------Jammu and Kashmir.	-National Pride	
		11	-Diamond is ------------------------and drilling.	-Appreciation	
			-Diamonds are found-----------------------(Andhra Pradesh)	-National Pride	

4-5		12	-Some properties-------------- ---in Table 1.1.	-Precision	-Ability to put data in precise form (Tabular form)
		14	**-(Answer these)** Question No.2------------	-Reasoning	
	1.2		**-(Materials Rich in Carbon)**		
		15	-Man has made --------------- ---------CARBON BLACK	-Appreciation (of knowledge)	
		16	-Try writing with it on paper.		-This statement can be further exploited for inculcation of value of spirit of team work through discussion, group work etc.
		18	-Carbon black is used -------- -----------metal or paper.	-Appreciation (of knowledge)	
6	1.3		**-(Carbon compounds)**		
		24	-Plant use it ------------------ ---------all living organisms.	-do-	
			-Thus, the delicate------------ ------------is maintained.	-Appreciation (inter-dependence)	
		25	-Carbon dioxide molecules--- ------------------atmosphere warm.	-do-	

			-What do you ---------------------to increase?	-Curiosity	
7		25	-Look at the relief ----------------------sea level?	-Curiosity -Quest for Knowledge	
		26	-Many animals living -------------------carbonate.	-Appreciation (of natural resources)	
7		29	-This is called--------------------------by boiling.	-Appreciation of knowledge)	
8		32	-It is used----------------------------fire fighting.	-do-	
		33	-It is used for washing------------------------textile processing.	-do-	
		34	-It is used in cooking -------------------fire fighting.	-do-	
		36	-Carbon monoxide is a poisonous ------------------of the body.	-do-	
			-You can now -----------------------well ventilated.	-do-	
		37	**(Answer these)** Question No.2---------	-Verification	

			Question No.3-------------	-Systematic Reasoning	
		38	**-(You Now Know)**		
			Carbon occurs---------- carbonates	-Precision	
		39	**-(Now Answer These)**		
			Question No.2---------------	-Systematic Reasoning	
			Question No.4------------	-do-	
			Question No.5----------	-do-	
			Question No.6----------	-do-	
			Question No.7-----------	-do-	

Chapter : Two
Title – Carbon Compounds : Fuels

Page	Section	Para	Content	Value	Remarks
10		1	- Hydrocarbons are------------------------------ --of carbon	-Appreciation (of knowledge)	
	2.1		**-(Carbon in Living Organisms)**		
		3	-Since carbon dioxide--------------------------------carbon	-Verification	
		5	-It is these---organisms	-Appreciation (of knowledge)	
11		6 and Fig. 2.1	-These biochemical processes----------(Fig.2.1)	Precision	
12	**2.2**		**-(Hydrocarbons)**		
12-13		9,10	**(Box)- (HUMPHREY DAVY)**		
			-In the early------------------------------------kingdom	-Appreciation (of knowledge)	
			-He carried out---------------------------------in the mine	-Systematic Reasoning	
			-The invention of---------------------------------taken	-Appreciation (of products of science)	
			-In the early-----------------------------------be taken	-Quest for knowledge	
14		16	-Methane (as a -----------------------------------methane	Appreciation (of knowledge)	

		17	-The new Hajira-Bijapur-----------------------fuel	-National pride	
		18	The carbon--chains	-Appreciation (of nature)	
15		22	-Their boiling points----------------------------Table (2.1)	-Precision	
		23	**-(Answer These)** -Question No.4-------------	-Systematic Reasoning	
	2.3		**-(Fuels)**		
		26	-Coal is an------------------------------------stations	-Appreciation (of knowledge)	
16		30	-In India, it is-----------------------------------basins	-National Pride	
17-18		33	-The higher the---------------------------------colour	-Precision	
		34 and Table 2.3	-All these products-----------------uses.	-Appreciation (of knowledge)	
			Table 2.3 lists ---------------------------------uses.	-Precision	
19		35	-The residue----------------------------------buildings	-Appreciation (of knowledge)	
	2.4		**-(Combustion)** **-(Activity 3)**		
19-20		39	-Can you work---------------------------hydrogen?	-Curiosity	
20		42	**-(Activity 4)** -Can you reason-------------------------------be so?	Systematic Reasoning	
		45	**-(Activity 6)** -How it----------------------------------flame?	Curiosity	

		46	-If you carefully------------------------------------flame?	-Systematic Reasoning	
20-21		47	-Since petrol -------------------------stoves.	-Objectivity -Appreciation	
22		56	**-(Activity 9)** -Observe the ----------------------------distinguish.	Honesty and Truthfulness	
		57	**-(Activity 10)** -Note down------------------------these.	-do-	
22-23		58,59 60	**(Box) (ZONES OF A FLAME)**		
			-It is the glow------------------------luminous.	-Appreciation (of knowledge)	
			-A flame has----------------------------1800 C.	-Quest for knowledge	
23		62	-As combustion -------------------------fire.	-Systematic Reasoning	
		64	-Water is very -------------------------air.	-Appreciation (of knowledge)	
		65	-However, water------------------------------situation.	-Systematic Reasoning Appreciation (of Knowledge)	
24		67	**-(Now you know)** -Hydrocarbons are compounds ----------- combustion	Precision	

Chapter :Three
Title : Light

Page	Section	Para	Content	Value	Remarks
25		1	-Sight is perhaps---------------------------our senses.	-Appreciation (of self)	
			-The sight of a ------------------------with delight.	-Appreciation (of nature)	
			-Fig 3.1	-shown a woman	
	3.1		**(Refraction – the Bending of Light)**		
		6	-**(Activity 1).** Now ask your friend -------------- basis.	-Team work	Restricted to help from a friend only
27		10	-Let us see -----------------------in the basis.	-Curiosity	
28-29		13,14	**(Box)-(Why does light----------------Another)**		
			Heading	-Curiosity	
			-Light travels in -----------------------speed.	-Appreciation	
			-This is the highest -------------------any medium.	-do-	
			-Light has a peculiar property	-do-	
			-Light is always in a great hurry.	-do-	
			-To understand---------------to save time including Fig 3.6.	-Systematic Reasoning	

			-Fig 3.6	-Precision	Drawn precisely on the information
30		16	-The higher the refractive -----------------in that medium.	-Precision	
		17	-What would happen ----------------one another?	-Curiosity	
31		19	-However, it is the -------------------to the incident ray.	-Appreciation	
		20,21	**(Box)---(The Spectrum)**		
			-Why does white light-------------the prism?	-Curiosity	
			-You know that white----------------light again.	-Systematic reasoning	
			-A rainbow is ---------- splitting.	-Appreciation	
			-White light from the sun-------------lowest?	-Systematic Reasoning	
			-In materials of ------------------rainbow colours.	-Appreciation	
		24	-You can readily test ------------lens.	-Verification	
			-If you hold a piece of --------------of the sun.	-Appreciation (of knowledge)	
			-This concentration -------------------and burn.	-do-	

			-Do not ever look --------------------eyes permanently.	-do-	
34		28	-Thus the moon---------------------appear as a point.	-do-	
35		33	-What would happen -------------------the candle?	-Curiosity	
36		34	-What would happened if ----------------candle?	-do-	
		35	-This is the principle ------------------lens works.	-Appreciation (of knowledge)	
36-37		36	-**(Activity 5)** If you hold this arrangement --------------appear magnified.	-Verification	
	3.2		**-(Microscopes and Telescopes)**		
		39	-There is, however one disadvantage ---------------inverted image.	-Objectivity	
			-However the inverted image can ---------------on hand.	-do-	
			-Binoculars also work on this same principle.	-Appreciation (of knowledge)	
		40	-The human eye is a remarkable organ.	- Appreciation (of nature)	
		42	-It can be corrected ----------------on the retina.	-Appreciation (of knowledge)	

			-The larger the bulge ---------------the spectacles.	-Precision	
			Including Fig.3.22 (a)		
39					
		43	-It can be corrected by -----------convex lenses including Fig.3.22 (b)	-Appreciation (of knowledge)	
39-40					
		44	**(You Now Know)**		
40			-The velocity------lenses	-Precision	
		45	**(Now Answer these)**		
			Question No.2	-Reasoning	
			Question No.7	-do-	

Chapter : Four
Title : Pressure

42	4.1		**-(Pressure)**		
		4	-Which pin pierces through the pile first ?	-Curiosity	
		5	-The force exerted on instances was the same	-Systematic Reasoning	
		7	**-(Activity 2)**		
			-Do you feel any-----------------------in the two cases?	-Curiosity	
			-When you hold------------------------------the bag	-Systematic Reasoning	
		11	**-(Activity 3)**		
			-The level of water-----------------------pressure exerted	-Verification	-Pressure meter a devise prepared which gives indication of pressure.
43		14	-It is this fact------------------------water in the Tube	-Appreciation (of knowledge)	
		15	**-(Activity 5)**		
			-At what depth is-----------------------depth is it least?	-Curiosity	

			-(Activity 6)		
		16	-What do you infer------------------------------observation?	-Curiosity	
		17	-In Activity 5------------------------------------the can	-Systematic Reasoning	
		20	-This happens because---------------------------unaffected	-do-	
44		21,22	**-(Activity 7)**		
			-What happens to the can?	-Curiosity	
			-When the can---------------------------------------the can	-Systematic Reasoning	
45		23,24,25	**-(Box)----------(Vaccum)**		
			-A similar experiment two ----------------------------------- hemispheres including Fig.4.3	-Quest for knowledge	
			-So great indeed----------------------------the two hemispheres	-Appreciation (of knowledge)	
46-47		30	-If for some reason-----------------------------are equalized	-Verification	-Making barometer
47		34	**-(Box)-(Our body-------------------------------pressure)**		
			-If the pressure due------------------------crushed by it ?	-Curiosity	

			-What would happen-------- ----------------in vacuum ?	-Curiosity	
			-These suits maintain-------- ------------internal pressure	-Appreciation of knowledge	-Application of knowledge to utility
			-If the pressure-------------- -------------high attitudes	-Quest for knowledge	
49		38	**-(Activity 8)**		
			-Mark lines along------------ --------------following table	-Precision -Honesty and Truthfulness	
49-50		39	-Archiemedes,the------------ -----------------his name	-Appreciation (of invention)	-Contribution of Scientist
			-Archimedes principle-------- ------------by the object	-Precision	
50		41	-However, by a suitable design---------object itself	-Appreciation Of knowledge	-Application of knowledge to making ships etc.
50-51		42	**-(You Now Know)** -A force is---------weight	-Precision	
51		43	**-(Now Answer these)**		
			Question No.1	-Systematic Reasoning	-Questions test knowledge given in the text
			Question No.2	-do-	
			Question No.3 Question No.4 Question No.5	-do- -do- -do-	

Chapter : Five
Title : Magnetism

Page	**Section**	**Para**	**Content**	**Value**	**Remarks**
52	5.1	2	**-(Magnets)**		
			-Around 800 B.C------------ ---------------------- wondrous properties	-Appreciation (of nature)	
			-Even stranger--------------- --------rotate freely	-do-	
54		5	-What do you observe ?	-Curiosity	
		6	-Like poles repel------------ -----poles attract	-Precision	
		7 (Box)	**-(TheWondrous Material)**		
			-Magnets have always-------- ---------associated with magnetism	-Quest for knowledge	
			-Magnets have--------------- ------------to man	-Appreciation (of nature)	
			-After a few days------------ ------had changed	-Verification	-One needs to test the idea before accepting it.
			-The Chinese---------------- -------for navigation	-Appreciation (of knowledge)	
			-Since it always------------- -------not visible	-do-	
			-The first person------------- -------with magnetism	-Appreciation -Perseverance -Appreciation (of contribution)	-Students may appreciate hard work and concerted effort as scientist's behaviour.

					However, teachers may explain it make it more effective.
				-Courage to Question	-Careful study helps to find out logical answers to superstitions
55		9	-Magnetic poles always---------------opposite pairs	-Appreciation (of nature)	
56		12	-Magnets must------------------------of soft iron	-Appreciation (of knowledge)	
57		13	-Let us see how ?	-Curiosity	
		14	-Remember, that--------------not attraction	-Systematic Reasoning	
	5.2		**-(Magnets and Electric Current)**		
58		20	-The fact that-----------------------this property	-Appreciation (of Knowledge	
59-60		21	**-(Now you Know)** -Some materials--------devices	-Precision	
60-61		22	**-(Now Answer These)** -Question No.3	-Systematic Reasoning	
			-Question No.5	-do-	
			-Question No.6	-do-	

Chapter : Six
Title : Electric Current

Page	Section	Para	Content	Values	Remarks
62		1	-Can you guess-------------------- -----have come	-Curiosity	-Some explanation is required to be given here why the objects mentioned here shed a particular charge
	6.1		**-(Nature of Electric------------ -----Sources)**		
63		4	-The earliest attempt------------- ---inventor	-Appreciation (of invention)	
		6	-The voltaic Cell---------------- smooth and steady	-Objectivity	
			-But Volta had------------------- ---in the year 1836	-Appreciation (of Knowledge)	
				-Quest for knowledge	-The other scientist was inspired by Volta and constructed another cell with improved design. Teacher is required to explain how further exploration leads to new or improved things.

64		7	-The Daniel Cell—————— ——current	-Appreciation (of invention)	
			-However, since----------- --cumbersome	-Objectivity	
			-This disadvantage-———— —French scientist	-Appreciation (of knowledge)	
65		9	-The batteries that———— described above	-Appreciation (of knowledge)	
		10	-All the cells—————— -disadvantage	-Objectivity	
		11	-In 1859——————— function again	-Appreciation (of knowledge)	
		12	-Sometime ago,———— properly	-do-	
65-66		13	-The British———— commercial scale	-do-	
			-This phenomena——— Generator	-Appreciation (of knowledge)	
66		16	·Consequently—————— -rotate them	-Objectivity	
	6.2		**-(Flowing charges have Energy)**		
		17	-We transform ———— - of the blades	-Appreciation (of knowledge)	

67	**6.3**		**-(Electric Circuits)**		
		18	-We ,therefore----------------by Fig.6.10 ?	-Precision	-Brief presentation of circuits in the form of symbols
	6.4		**-(Conductors and Insulators)**		
			-(Activity I)		
68		20	-Note the cases--------------- insulators	-Honesty and Truthfulness	
			-(Activity 2)		
		22	-Note the cases--------- Light up	-do-	
69	**6.5**		**-(Effects of Electric Current)**		
		23	-Appliances like----------------- -emit light	-Appreciation (of Knowledge)	-Application of knowledge in objects of daily use.
70		24	-Safety fuses thus------------low melting point	-do-	-Application to daily life
		27	-The most common------- attractive look	-do-	-Application of processes
71		28	-Observe the deposition on the carbon rod.	-Verification	-Electroplating

		29	-This principle------------------- --iron pieces	-Appreciation (of knowledge)	
72	**6.6**	67	**-(Hazards of Electric currents)**		
		31	-We ,therefore-----------wet places	-do-	-Safety from electric current
		32	-This makes sure----------- barefoot or wet	-do-	
		33	Careful handling------- accidental fires	-do-	
73		34	**-(You Now Know)** -Electric charges----------- earthed	-Precision	
		35	**-(Now Answer These)**		
			Question No.1	-Honesty and Truthfulness	
			Question No.4	-Systematic Reasoning	
			Question No.-5	-Creativity	
			Question No.6	-Honesty and Truthfulness	

Chapter: Seven
Title: Rocks, Minerals and Metals

Page	Section	Para	Content	Value	Remarks
75		1	-Have you ever------------- -------------------formed ?	-Curiosity	-Before this sentence, it would have been appropriate to mention names of some of the materials to arouse curiosity
		2	-Rocks vary--------------- ------separately(Fig.7.3)	-Appreciation (of nature)	
76		4	-Deep inside--------------- --------------DIAMOND	-do-	
78-79		6-10 (Box)	**-(Story of the Earth)**		
			-A piece of rock----------- ---------------technonics	-Quest for knowledge	
	7.1		**-(Rocks and Minerals)**		
80		12	-The first rock------------- ----------------------way	-Appreciation (of knowledge)	
			-Can you reason why ?	-Curiosity	
81			-A large part--------------- ----------basaltic rocks	-Appreciation (of nature)	

		13	-From such studies------------------of life	-Appreciation (of knowledge)	-Application of study of FOSSILS to scientists.
			-Can you think--------------------------limestone ?	-Curiosity	
82		15	-However, perfect------------------------great value	-Appreciation (of nature)	
		16	-There are about--------------------properties	-do-	
		17	-Colour should ------------------------minerals	-Appreciation (of knowledge)	
83		19	-The more tightly-------------------------mineral	-Precision	
			-This property---------------------------mineral	-Appreciation (of knowledge)	
		21	-Can you tell----------------------------possess ?	-Curiosity	
85		22	-From the earliest-----------man made materials	-Appreciation (of knowledge)	-Uses of minerals for human beings.
		23	-The non-metallic---------------------industries	-do-	-do-
		24	-Minerals are-------------------------Table 7.1 including Table7.1	-do-	

			-Table 7.1	-Precision	
86		**25-28 (Box)**	-**(Gemstones)**		
		25	-Gems are the most--------------(DISPERSION)	-Appreciation (of nature)	-Beauty and utility of gemstones
		26	-Ruby and Sapphire-------------------($Al_2 O_3$)	-do-	
			-Thus, whilst the---------------------gem qualities	-Appreciation (of knowledge)	
			-The same corundum-------------------sapphire	-Appreciation (of nature)	
		27,28	-However, it is--------------------in watches	-Appreciation (of knowledge)	
		25-28	Gemes are the-----------------------in watches	-Quest for knowledge	
86-88		29-44 (Box)	**(Mineral Wealth of India)**		
		29-44	-The mineral wealth-------------Jaduguda in Bihar	-Quest for knowledge	-Knowledge of the places and minerals including precious ones with their utility etc. is interesting and exciting.
86		29	India has fairly-------------------some petroleum	-National Pride -Appreciation	

			-However, we have very-- --------------platinum	-Objectivity	
87		30	-India has one------------- ----------------iron are	-National Pride -Appreciation	
		31	-India does not----------- -----------copper minerals	-Objectivity	
		32	-The Kolar gold---------- ---------world production	-do-	
		33	-India has rich------------- -----------Jammu and Kashmir	-National Pride and -Appreciation	
		34	-India is one of the-------- ------------manganese	-National Pride -Appreciation	
		36	-Limestone is found------- ----------------Pradesh	-National Pride	
87-88		37	-Titanium is------------- -------------last for ever	-Appreciation (of knowledge)	
			-India has considerable--- -----------Tamil Nadu	-National Pride	
88		38	-India is the chief producer of mica	-Appreciation -National Pride	
		39	-India has vast deposits--- ---------------Kerala	-National Pride -Appreciation	

			-Thorium is the------------------------nuclear fuels	-Appreciation (of knowledge)	
		42	-It is available in large-------------------deposits	-National pride -Appreciation	
			-However, most Indian ------------------volatiles	-Objectivity	
88		45	**(Answer these)**		
			-Question No.6	-Systematic Reasoning	
			-Question No.10	-do-	
89	7.2		-**(Metallic Minerals)**		
89-90		46	-Ores of some-------------------- Table 7.2	-Precision	
91	7.3		-**(Extraction of metals)**		
		56	-Although modern--------------------daily life	-Appreciation (of knowledge)	-Uses of iron in various forms
		57	-Iron has long-----------------------------metal	-Appreciation (of knowledge)	
92		59	-It is mainly used--------------------------surface	-Appreciation (of knowledge)	

		60	-It is impure iron————————————cheapest	-do-	
			-Pipes, sinks——————————————cast iron	-do-	
		61	-Wrought iron is——————————————carbon	-do-	
			-Wrought iron is————————————stronger iron	-do-	
93		64	-It is further refined——————————percent purity	Precision	
94		66	-Copper wires are used————————other metals	-Appreciation (of knowledge)	
94		67	-Aluminium is the————————————are limited	-Appreciation (of knowledge)	
		68	-In India,——————————————————of boxite	-National Pride	-Knowledge of one's country
94		70	-Aluminium is————————————widely space rockets	-Appreciation (of knowledge)	
95		71-73 (Box)	(Metals have been used————————middle ages	-Quest for knowledge	
		72	-The discovery of copper———————civilization	-Appreciation (of knowledge)	

		74	**-(Answer these)**		
			-Question No.2	-Systematic Reasoning	
	7.4		**-(Alloys and their Properties)**		
95-96		76	-For example, copper------------------objects	-Objectivity	
96			-Again,pig iron------------------------rusts	-do-	
			-Around 2500 B.C-------------BRONZE AGE	-Appreciation (of knowledge)	
97		77	-The next important-----------------------iron	-do-	
			-Iron metallurgy was---------------large objects	-National pride -Appreciation (of knowledge)	
		78	-Aluminium which-----------------------alloys	-do-	
			-Magnalium-------------------------gold ornaments	-do-	
		79	-Alloys play an--------------------and uses including Table 7.3	-do- -Precision	
97-98		80-(Box)	**(Recycling of Metals_)**		
		80-82	Useful ores and -------------------recycle them	-Quest for knowledge	-Attention is drawn towards depletion

				-Protection of environment	of mineral resources, concern for over use and need to carefully use and conserve the metal reserves.
97		80	-Useful ores and--------------------millions of years	-Appreciation (of knowledge)	-Recycling as one of the methods is suggested.
98		82	-These estimations---------------------of metals	-do-	
		80	-As we go on extracting-----------------run out	-Precision	
		83	**-(Answer these)**		
			Question No.1	-Systematic Reasoning	
98-99		84	**-(You Now Know)** -The earth's ---------man	-Precision	
100		85	**-(Now Answer these)**		
			Question No.1	-Systematic Reasoning	
			Question No.4	-do-	
			Question No.6	-do-	

Chapter : Eight
Title : Metals and their properties

Page	Section	Para	Content	Value	Remarks
101	**8.1**		**(Metals)**		
		3	-Note their appearance	-Honesty and Truthfulness	
		4	-The shiny appearance-------------------decorations	-Appreciation (of knowledge)	
			-Silver is an excellent reflector	-Appreciation (of nature)	
101-102		5	-What is the-------------------------------and copper ?	-Curiosity	
102		6	-What do you observe ?	-Curiosity	-Curiosity is killed due to answers immediately given following the question. It could be maintained by asking them to have experience with some other metals giving names but not providing answers.
		7	**(Activity 2)** **Teacher Demonstration**		
			-Dry a small piece-----------------------------is soft	– Systematic reasoning	
			-It shows that-------------------------------------is soft.	– Verification	
		9	-Gold and silver---------------------------milk bottles.	-Appreciation (of knowledge)	

		11	-Electricity flows---------- ----------electric cables	-Appreciation (of knowledge)	
		12	-Cooking utencils---------- ---------------of heat	-do-	
			-The best conductors------ ----------------of heat	- Precision	
102-103		13	-They are, therefore--------- ------------instruments	-Appreciation (of knowledge)	
103		14	-Some metals--------------- -----------and machinery	-do-	
		17	-Some metals -------------- ---------------strength	-Appreciation (o nature)	
		26	-Sodium can be substance known	-do-	
104		32	-Observe the changes------ --------------Table 8.1	-Honesty and Truthfulness	
105		35	-This property------------- -----------non-metal	-Appreciation (of knowledge)	
		36	-They are, therefore-------- ------------jewellary	-do-	
		37	**(Answer these)**		
			-Question No.3	- Systematic Reasoning	-Answer not given in the text.
			-Question No.4	-do-	
106	**8.2**		-**(Reactivity of Metals)**		

		40	-To prevent this-------------------------------oil	-Appreciation (of knowledge)	-Utility in life
			-This oxide layer-------------------------underneath it	-Appreciation (of process)	-Utility value of scientific process
107		43	**(Activity 6)**		
			-Test the gas----------------------------hydrogen	-Verification	-Presentation of fact is followed by activity to show students how they can verify facts.
		46	Reaction of metals-----------------------citrus fruits	- Appreciation (of knowledge)	-Implications of facts for daily life.
108		48	**-(Answer these)**		
			-Question No.3	- Systematic Reasoning	
			-Question No.4	-do-	
	8.3		**(Metals Replace other Metals)**		
109		52	-A similar-----------------------------------zinc	- Verification	
		53	-Let us---------------------------------------iron	- Curiosity	
		56	-On the basis----------------------------reactivity	- Precision	-Students learn to conclude on the basis of observations

110		58	From these experiments—— ————————————	- Precision	-Students learn to conclude on the basis of observations
		59	**(Answer these)**		
			Question No.2———	- Systematic Reasoning	
			Question No.3———	-do-	
	8.4		**-(Corrosion)**		
		60	-Damage by corrosion—— ———nation's economy	-Protection of environment (concern)	-A line or two following this statement on damage by corrosion is required to make it clear how it causes loss to nation. Otherwise it is left for the teacher to explain.
		62	-If the oxide layer———— ——————effectively	- Systematic Reasoning	
111		63	-Aluminum objects——— ————————colours	-Appreciation (of knowledge)	-Importance of scientific knowledge to industry
		67	-Gold does not—————— ————————of use	-Appreciation (of knowledge)	
		68	-India is————————— —————————its ore	-National Pride	-Availability of ore in our country and development of technology by India.
			-Titanium is—————— ———————forever.	-Appreciation (of knowledge)	

112		69	-This gives us ------------------CORROSION ?	-Appreciation (of knowledge)	
113		75	**-(Answer these)**		
			-Question No.2-------	-Systematic Reasoning	
			-Question No.3-----	-do-	
113-114		76	**-(You Now Know)** -Elements can be---------- corrosion	- Precision	
114		77	**-(Now Answer these)**		
			Question NO.4---------	-Systematic Reasoning	-Students are directly asked 'suggest reasons why'.
115			Question No.10------------	-Verification	

Chapter : Nine
Title : Man Made Materials

Page	Section	Para	Content	Value	Remarks
116	9.1		**(Materials Made in Ancient Times)**		
		5	-An important-------------------------daily life	-Appreciation (of knowledge)	-Innovation of materials of daily use
117		5	-Infact,archaeologists-------------world	-do-	
		6	Metals had ---------------------------------durability	-Appreciation (of nature)	-Extraordinary properties of metals
			-The use of--------------------------------make	-Appreciation (of knowledge)	-Contribution to civilization
118		9	-Some stones---------------------------buildings	-Appreciation (of nature & knowledge)	
			-The strength-------------------------------India	-Appreciation (of knowledge)	-Contribution to civilization
			-It is the-----------------------------dam	-National pride Appreciation	-Students appreciate that the world's largest'MASONARY'(stone work)dam is in India.
		10	-Another natural stone-----------------MARBLE	-Appreciation (of nature and knowledge)	

			-The famous Taj Mahal-----------marble	-National Pride -Appreciation (of knowledge)	-Taj Mahal is pride of nation and students learn to appreciate the stones used in its construction.
118		11	-The Red Fort------------------ Sandstone	-National Pride -Appreciation(of knowledge)	-do-
		12	-Brick were---------------- civilization	-Appreciation (of knowledge)	-Contribution to civilization
		14	-In 1824------------------------- -to water	-Appreciation (of knowledge)	-Contribution of scientist to the civilization.
119		15	-Concrete can----------------- sleepers	-Appreciation (of knowledge and products)	-Contribution to daily life.
		17	-Asbestos concrete-------------- bridges	-Appreciation (of knowledge)	-do-
		18	-The invention of cement----- homes	-do-	-Revolutionary effect of discoveries of science on life.
119-120		19	**(Answer These)** -Question No.3 -Question No.6	-Objectivity -do-	-Students are required to list the information without bias.

120	**9.2**	21	**-(Glass)** -Because of------------------ microbes	-Appreciation (of knowledge)	-Products of science have contribution to society.
		22	-It has a ------------------- reactive chemicals	-Appreciation (of knowledge)	-Utility of products of science
121		23	-Glasses made-------------- mirrors and crockery	-do-	-do-
		24	-The major disadvantage ------ applications	-Objectivity	
122		26	-Plate glass----------------------- doors	-Appreciation (of knowledge)	-Utility of products of science
		29	-Laminated glass or--------- safety glass	do-	
			-The larger--------------------the glass	-Precision	-Information given precisely
			-Laminated glass is--------- screens	-Appreciation (of knowledge)	-Utility of products of science
123		33	-Lead glass------------------- glass ware	-Appreciation (of knowledge)	-Products and their beauty and utility
			-Cut glasses--------------- sparkle	-Appreciation (of product)	
		34	-Fibres of glass------------- industry	-Appreciation (of knowledge)	-Products of science in use.

		36	-They, therefore------------water tanks	-Appreciation (of knowledge)	-Products of science, contributing to growth of civilization
		37	-Optical fibres-------------fibre tubes	-do-	
		38 (Fig. 9.49	-This property is---------- (Fig.9.49)	-do-	-Figure is poor, therefore does not create interest or serve purpose.
123-124		39	-Optical fibres----------- information	-Appreciation (of knowledge)	-Revolutionary contribution of products of science to civilization
124			-Electric signals------------ cables	-Objectivity	
		40	-**(Answer these)**		
			-Question No.4	-Creativity -Quest for knowledge	-The students are required to think and explore further.
	9.3		-**(Ceramics)**		
		44	-Glazed pottery is----------- ceramics	-Appreciation (of knowledge)	-Utility of products of science in our daily lives.
		45	-It is used----------------- crockery	-do-	-do
		46	-Ceramics have--------------- uses	-Appreciation (of knowledge)	

			-Ceramics are,———— industry	-do-	-Utility of products of science in industry
126		47	-Some ceramics-----------long time	-do-	-do-
		48 (box)	**-Ceramic superconductors**		
			-Recently————our lives	-Quest for knowledge	-Additional information is provided which arouses interest.
		49	**-(Answer these)**		
			-Question No.1	-Systematic Reasoning	
	9.4		**-(Polymers and Plastics)**		
127		52	-Since these hooks——-strong	-Systematic Reasoning	
		53	-Some obvious advantages————shapes	-Appreciation (of knowledge)	-Advantages of products of science.
		54	-You may---------------- material	-Curiosity -Quest for knowledge -Appreciation(of knowledge)	-Contribution of products of science in a big way that many more uses could be thought of
		55	-It is tougher————leather like material	-Appreciation (of knowledge)	-Utility of product of science
		56	-It is extensively———— coolers	-Appreciation (of knowledge)	-Utility of product of science

		57	-However, being soft------ scratched	-Objectivity	
128		58	-One of the best---------- expensive	-Appreciation (of knowledge) Objectivity	-Limited utility of products of science is given without bias.
		59	-It is therefore------------them sets	-Appreciation (of knowledge)	-Utility of products of science in life.
		60	-They are used------------- expensive	-do-	-do-
		62	-They are used------------- parts	-do-	-do-
		63	-They are largely---------- blankets	-do-	-do-
128-129		64	-Synthetic fibres----------long time	-do-	-do-
129		65	-There are some------------ wool	-Objectivity	
		67	-(**Answer these**)		
			-Question No.1	-Systematic a Reasoning	
			-Question No.3	-do-	
	9.5		-(**Other Man-Made Materials**)		

130		73	-Without the use------------ people	-Appreciation(of knowledge)	
			-This is now----------------- country	-Appreciation (of knowledge) (Indigenisation)	-Knowledge about our country creates a feeling of pride
131		76	-Chemical fertilizers-------------------or so	-Appreciation (of knowledge)	-Contribution of products and processes of science to life.
			-This has been--------------- farming	-do-	-Contribution of products and processes of science to life.
		77	-Man made---------------insects	-do-	
		78	-Pesticides have--------------to them	-Objectivity	-Harmful effects of products of science are also given.
132		Fig.9.5	-DDT in the food chain	-Precision	-Representation is brief and in clear form in figure.
		79	-A major problem--------after use	-Protection of environment (concern)	-Students are made conscious of harmful effects of man made materials on environment.
			-Unfortunately-------------is no.1	-Objectivity	-Information is based on facts.

132-133		80	-Unfortunately,all this------ human body	-Open-mindedness -Objectivity	-Students learn that still much is required to be explored.
133		80	**-(Answer these)**		
			-Question No.2	-Systematic Reasoning	
		82	**-(Now You Know)** - Man has---------organisms	-Precision	
133-134		83	**-(Now Answer These)**		
			Question No.2	-Systematic Reasoning	
			Question No.5	-do-	
			Question No.6	-do-	

Chapter : Ten
Title : Microbial World

Page	Section	Para	Content	Value	Remarks
135		2	-Examine this-------------------------------------observe	-Honesty and Truthfulness	-Students are expected to observe and note their observations
		4	-All these -------------------------------------conclusion	-Precision	
			-They are usually----------------------------animals	-Appreciation (of nature)	-Students learn to appreciate wonderful living world
136			-You can see------------------ elephant including Figure 10.1 g	-do- -Curiosity	
137		6	-An important ------------------------------hardy	-Appreciation (of nature)	
			-Micro organisms are-------------------micro organisms	-Appreciation (of knowledge) -Objectivity	
			(Activity 1)		
		7	-Now, let us--------------------------------------object	-Curiosity	-The content arouses imagination
		8	-Suppose-----------------------------------than years ?	-Curiosity -Systematic Reasoning -Quest for knowledge	-It does not only arouse curiosity but also promotes further learning and analytical ability

	10.1		**-(Major Groups of Micro-organisms)**		
		10	-Viruses are-------------------------------micro organism	-Appreciation (of nature)	
138		11	-Some bacteria---------------------------processes	-Objectivity	
			-Some bacteria------------------------------humus	-Appreciation (of knowledge)	
138-139		13 (Box)	**-(Do you know How Curd is Made ?)**		
			-You need a small---------------------------properly	-Curiosity -Systematic Reasoning	
139		14 and Table 10.1	-You will notice-------------------------------effects	-Objectivity	
			-You will notice-------------------------------uses	-Appreciation (of knowledge)	
		15	**(Activity 2)**		
			-Mix one part----------------------------------if any	-Honesty and Truthfulness	
			-Can you-------------------------------------winter ?	-Systematic Reasoning	
			-What would-----------------------------------hours	-do-	

			(Activity 3)		
140		16	-A bacterium--nature	-Systematic Reasoning	
		17	-Have you--jam ?	-Curiosity	
		17 and Fig.10.3	They come-------------------- -Fig.10.3(including Fig.10.3	-Appreciation (of nature)	
		18and Table 10.2	-Table 10.2 gives---------------------------------fungi	-Appreciation (of knowledge)	-Both useful and harmful effects of fungi on human living are given.
140 & 142		19	-But do you---------------------------------fluffy	-Curiosity	
			-When yeast-----------------------------------spongy	-Systematic Reasoning	-The information is also relevant to daily life.
142		20	-In this case---------------------------------------sour	-Systematic Reasoning	
			-Where do you----------------------------------from ?	-Curiosity	-The curiosity, however, is killed with immediate answer given in the text.
		21	-**(Activity 4)**		
			-Carefully observe------------------------------you see	-Honesty and Truthfulness	
			-Why should----------------------------------food ?	-Systematic Reasoning	

		22 Fig.10.4	Algae form-----------------------------------Fig.10.4	-Appreciation (of nature)	
143		23	-Do you know-----------------------------------name ?	-Curiosity	-Curiosity is killed with immediate answer given in the next line
143-144		24 and Table 10.3	-Table 10.3 shows---------------------------lives	-Appreciation (of knowledge)	
144		25	-**(Activity 5)**		
			-Do you see-------------------------------------grow ?	-Honesty & Truthfulness	
			-Why do you-----------------------------------algae ?	-Systematic Reasoning	
		28	-They can be----------------------------------animals	-Objectivity	
144-145		Table 10.4	-**(Role of Protozoa in the World Around Us)**	-Appreciation (of knowledge)	
145-146		29	-**(Activity 6)**		
			-Concentrate your----------------------behaviour	-Honesty & Truthfulness	
			-If you observe------------------------------process	-Quest for knowledge	-The students are motivated to continue observation to be able to see

					interesting phenomena further.
146		30	-Also,observe------------------ ---------and 10.1 e	-Verification	
			-Note down -------------------- ----------------you see	-Honesty and Truthfulness Precision	
		31	-These and many-------------- ---------------VIRSUSES	-Appreciation (of knowledge)	
			-It is not------------------------ -------------their own	-Open-mindedness	
147		33	-**(Answer These)**		
			Question No.4	-Systematic Reasoning	
	10.2		-**(Micro-organisms and Diseases)**		
		34	-Some of them are------------- -------------animals	-Objectivity	
148		35	-Leprosy----------------------- --------------exposure	-Courage to Question	-Referring to common thinking, students are provided information
		37	-Can you---------------------- ---------------manner ?	-Systematic Reasoning	-Students are required to think and provide solution to the problem
		38	-If you------------------------- --------------control it	-Appreciation (of knowledge)	-Science can contribute to health hygiene by

			-Table 10.5 lists---------------------------------prevention	-do-	providing knowledge about causes and modes of spreading diseases and methods of prevention
148-149		Table 10.5	-Table 10.5--------------	-Precision -Appreciation (of knowledge)	
149-150		39-40 (Box)	**(AMOEBIASIS)**		
			-But, if you---defecation	-Appreciation (of knowledge) -Systematic Reasoning	
			-Proper sanitation-----------------------------disease	-Protection of Environment	
150		41	-**(Answer These)**		
			Question No.3	-Systematic Reasoning	
	10.3		-**(Uses of Micro-organisms)**		
		42	-Each micro-------------------------organism nature	-Appreciation (of nature)	
			-By trying to------------------------------processes	-Appreciation (of knowledge)	

		43	-This shows that------------------------------others	-do-	
151		44	-It is from ----------------------------diseases	-Appreciation (of contributions of science)	-Contribution of scientific discoveries for the betterment of humanity
		46	Antibiotics are---------------------------------pathogens	-Appreciation (of knowledge)	
		47	-However, a far more-------------------------by them	-Appreciation (of inventions)	
			-This discovery-------------------------small pox	-Appreciation	-Students learn to appreciate that 'keen observation' is an attribute of a scientist.
			-You might wonder----------------------itself	-Curiosity	
152		48	-When the cells-------------------IMMUNIZATION	-Systematic Reasoning	
		49	-The tetanus vaccine---------------------in time	-Appreciation (of knowledge)	
		Fig.10.8	Figure 10.8	-Precision	
		50	-Today, one does--------------------extirpated	-Appreciation (contribution of scientist)	-Scientific discoveries improve life of people.

153		52	-They are --------------------- ---------------growth	-Appreciation (of knowledge)	
			-All pulses are----------------- ----------------protein	-Appreciation (of knowledge)	
		53	-Thus, scientists---------------- -----------INSULIN	-Appreciation (of contributions of Science)	
154	**10.4**		**-(Storage and Preservation)**		
		56	-Insecticides and Fungicides-- -----attacks	-do-	
		57	-Pickles, are--------------------- --------------squashes	-Systematic Reasoning	
		58	-Keeping food----------------- ------------storage	-Appreciation (of knowledge)	
155		60	-This is why------------------- ---------------silos	-Appreciation (of knowledge)	
			-Therefore, in order ---------- -----------------first	-do-	
		61	-Therefore, in order to--------- -----------around us	-do-	

		62	-**(Answer These)**		
			Question No.1	-Systematic Reasoning	
			-Question No.2	-do-	
			-Question No.3	-do-	
			-Question No.4	-do-	
			-Question No.5	-do-	
155-156		63	-**(Now You Know)** -Organisms -------action	-Precision	
156-157		64	-**(Now Answer These)**		
			-Question No.7	-Systematic Reasoning	
			-Question No.8	-do-	

Chapter : Eleven
Title : Agriculture : Practices and Implements

Page	Section	Para	Content	Value	Remarks
159	11.1		**-(Crop Plants)**		
159-160		4	-India produces---------------- ------------------------people	-National Pride	-Indigenous information provided to students.
160		7	-Therefore,in order------------ --------------------every day	-Appreciation (of knowledge)	
	11.2		**-(Basic Practices or Crop Production)**		
161		10	-Agriculture thus--------------- ---------------------------field	-Precision	
		11	-Even after they---------------- -------------------HUMUS	-Appreciation (of knowledge)	
163		18	-What conclusion--------------- ---------------experiment ?	-Systematic Reasoning	-There is scope for students to learn on their own as no ready made answer to the experiment done is given in the text
			-Now observe------------------- ------------------------seeds	-Honesty & Truthfulness	
		21	**-(Answer These)**		
			-Question No.1----------------	-Systematic Reasoning	

			-Question No.3----------------	-Curiosity -Quest for knowledge	
	11.3		**-(Manuring, Weeding and Irrigation)**		
164		26	-It is therefore------------------ -------------------them out	-Appreciation (of knowledge)	
165		27	-Since the weedicides--------- ----------------------------use	-Appreciation (of knowledge)	
	11.4		**-(Protection,Harvest and Storage of Crops)**		
167		31	-Pesticides sprays--------------- ------------------------------them	-Appreciation (of knowledge)	-Utility of knowledge in daily life
		32	-It is, therefore------------------ -------------------posionous	-do-	-do-
168		33	This change of colours--------- ------------blossoming flowers	-Appreciation (of beauty of nature)	
		35	-Men and women------------- --------------------festivals	-Appreciation (of culture)	-Students appreciate festival celebrating prayer and religious rites during harvesting time in the country
	11.5		**-(Improvement of Crops)**		
170		42	-How did ---------------------- -----------------------about ?	-Curiosity	-But immediate answer is provided here which kills curiosity
		46	-To prevent this---------------- -------------------alternately	-Appreciation (of knowledge)	

171		50	-Since most chemicals-------- ----------------------pests	-Perseverance	-Results cannot be achieved immediately. Continuous experimentation may eventually give fruitful result
172		53	Such infestation-------------- ------------------eat them	-Appreciation (of knowledge)	
			-Do you realize--------------- --------------------cooked ?	-Systematic Reasoning	-Significant impact on human survival
		55	-It is, therefore---------------- ------------------1987	-Appreciation (of knowledge)	
		56	**-(Answer These)**		
			-Question No.2	-Systematic Reasoning	
	11.6		**-(Our Responsibility)**		
172-173		57	-Table 11.3------------------- -------------------fifties	-Appreciation (of knowledge)	-Country's achievements in food production and its affect is a matter of great pride
			-Without this------------------ -------------------------one	-do- -National Pride	
			-There are, however,---------- -----------------------efforts	-Objectivity	
			-It is this collective------------ ---------------self sufficient	-Appreciation (of collective national effort)	-Emphasis is on collective national effort of farmers, scientists and people engaged in storage, marketing and

					distribution make country self sufficient on food.
173-174		59	But unfortunately------------------------------------now	-Observance of small family norm	-Growth in good production does not match overgrowing population
174		60	-Will we -------------------------------------everyone ?	-Observance of small family norm	
		61	-As it would-----------------------------------population	-do-	-Direct emphasis on reducing the rate of growth of population. Further teacher is expected to talk about small family.
		62	-However, if pesticides------------------------degradation	-Objectivity	
			-Indiscriminate----------------------------consumption	-Protection of Environment (concern and responsibility)	-Concern for environmental degradation (soil,water) due to use of pesticides and fertilizers and responsibility for its protection is emphasized.
			-We should, therefore-----------------------agriculture	-Appreciation (of knowledge)	
		64	-**(Now You Know)** -Agriculture---------diseases.	-Precision	
		65	-(**Now Answer These)**		
			-Question No.3	-Systematic Reasoning	

Chapter :Twelve
Title : Useful Plants and Animals

Page	Section	Para	Content	Value	Remarks
176		1	-Look at yourself--------------------------decoration ?	-Curiosity	-Many questions together arouse curiosity/interest
			-Have you tried-------------------------------made of	-do-	
			-Can you list-------------------------------------	-Curiosity -Quest for knowledge	
		2	-Similarly, not---------------------------------us	-Objectivity	
	12.1		**-(Plants that Affect Our Life)**		
		3	-In early days-----------------------------------easily	-Appreciation (of knowledge)	
177		5	-All the food -------------------------------vitamins	-do-	
		6	-So all food-----------------------------------protein	-do-	
		7	-Can you name-----------------------------obtained ?	-Curiosity	
		8	-Can you say---------------------------purposes ?	-do-	
178			-Can you name--------------------------vegetables ?	-do-	
			-Fruits are also-----------------------------them	-Appreciation (of knowledge)	
		9	-One of the spices	-do-	
			-India is----------------------------------chillies	-National Pride	

		10.11 (Box)	-One particular group--------- --------------------- ---year	-National Pride	-India's place in the world in production of condiments
			-One particular group orchid fruit	-Appreciation (of knowledge)	-Information related to life and country
178-179		13	-Can you think---------------- --------------------materials ?	-Curiosity	
			-Cotton is mostly------------- -----------------------plant	-Appreciation (of knowledge)	-Indigenous
		Table 12.1	-Table 12.1------------------	-do-	
179		15	-Due to the need-------------- -------------excessively	-do-	
		16	-Beautiful colours------------ ----------------pleasure	-Appreciation (of beauty of nature)	
			-Can you-----plants ?	-Curiosity	
180		17	-Some of these---------------- --------------------needs	-Appreciation (of beauty of nature)	
		18	-Sandalwood------------------ ----------------------India	-do-	-Indigenous information is also given.
			-Name some ------------------ ----------------daily life	-Curiosity	
		19	-There are--------------nature	-Appreciation (of knowledge and nature)	

			-Indiscriminate-----------------------------------balance	-Protection of Environment	
			-Can you---shade?	-Curiosity	
		20	-These plants are-----------------------------country	-National Pride	
		21	-The tarmarind------------------------------------food	-Appreciation of knowledge)	
		22	-A class of-------------------------aesthetic plants	-do-	
180-181		25	**-(Answer These)**		
			-Question No.1------------	-Quest for knowledge	-The information is not provided in the text
			-Question No.3--------------	-do-	-do-
181	12.2		**-(Animals that Affect Our Lives)**		
181		24	-Unlike plants-----------------------------------large	-Objectivity	
		27	-Just like---to us	-do-	
			-Can you---animal ?	-Curiosity	
			-But we have------------------------------medicines	-Appreciation (of knowledge)	
		30	-They have extraordinary-----------------------food	-Appreciation (of nature)	

	12.3		**-(Useful Animals-Animal Husbandry)**		
182		34	-A breed of---the plains	-Appreciation (of knowledge)	
183		38	-We have the---millions	-National Pride	
			-Since all these--well	-Objectivity	
		40	-Though we have------------------------------------milk	-do-	
184		42	-How does one---ill ?	-Curiosity	
		Table 12.3	-Table 12.3-------------------	-Appreciation (of knowledge)	
		43	**-(Activity 1)**		
		44	-Keep a watch---ill	-Honesty and Truthfulness -Quest for knowledge	
		44	-Also visit a veterinary---------------------------closely	-Quest for knowledge	
		45	-A much dreaded---------------------vaccinated	-Quest for knowledge -Appreciation (of knowledge)	
		47	-How does one prevent these diseases ?	-Curiosity	
			-The best thing is-----------------------------regularly	-Appreciation (of knowledge)	

185	12.4		**-(Smaller Animals)**		
		51	-A better and more----------- -------------fibre	-Appreciation (of knowledge)	
		52	-Fine,fluffy------------------ -----------------priced	-Appreciation (of knowledge)	
186		54	**-(Activity 2)**		
			-Observe these-------------- --------------differences	-Honesty & Truthfulness	-Students observe and record-This activity could have emphasized 'verification' if two lines would have been added giving reason to the burning characteristic of wool and cotton.
			-Burn each of these fibres--- ---------------does not	-Quest for knowledge	
187		57	-Observe a cock------------- -------------behaviours	-Honesty & Truthfulness	
		58	-If they do not---------------- ------------------eggs.	-Systematic Reasoning	
188		61	-RHODE------------------- ---------------death rate	-Appreciation (of knowledge)	
		64	**-(Activity 3)**		
			-You can detect-------------- ------------------water	-Systematic Reasoning	
		65	**-(Activity 4)**		
			-If an egg is----------------- ------------------within	-do-	
		66	-It is an-------------------- -------------medicines	-Appreciation (of knowledge)	
190		67	-Another useful------------- --------------------things	-do-	

		69	-Honey is--nutrients	-do-	
			-If it is pure--easily	-Systematic Reasoning -Verification	
		71	-The silk fibre-------------------------------(next to wool)	-Appreciation (of knowledge)	
190-191		72	**-(Activity 6)**		
			-Now keep a record------------------------life cycle.	-Honesty & Truthfulness	-The beginning life of the activity does not indicate the purpose of the activity. Also the last line of the para above the activity does not indicate purpose of the activity .The purpose becomes clear to some extent in the lines given here under the content.
			-What happens to-------------------------------leaves	-Systematic Reasoning	
191		73	-India has--silk	-National Pride -Appreciation (of knowledge)	-Information on India's long tradition.
			-China is--country	-do-	

		74	-Other than goal---------------- -------------Vitamin D	-do-	
192		77	-India was------------------------ ------------------1985 -	-National Pride	-India's position in top ten fish producing countries
192		78	Very expensive--------------- -------------------skin	-Appreciation (of knowledge)	
		79	-It covers the----------------- ----------------expensive	-Appreciation (of knowledge) and (beauty of nature)	
		80	-Man has used----------------- ---------------medicines	-Appreciation (of knowledge)	
		81	-**(Answer These)**		
193			-Question No.2	-Systematic Reasoning	
		82	-**(Now You Know)** -Many plants--------fish	-Precision	
		83	-**(Now Answer These)**		
			-Question No.7	-Systematic Reasoning	

Chapter : Thirteen
Title : Organic Evaluation

Page	Section	Para	Content	Value	Remarks
194		1	-What is striking---------------------------diversity	-Appreciation (of nature)	
			-There are--------------------------------today	-Appreciation (of knowledge)	
			-How a living----------------------created ?	-Curiosity	-No immediate answer is given.
	13.1		**-(How do species Originate) ?**		
		6	-The question----------------------------facts	-Verification	-Direct emphasis on evidence is given
194-195			-A scientist-------------------------and facts	-Systematic Reasoning	-The steps a scientist follows to solve the problem are given
196	13.2		**-(What do the Fossils Say) ?**		
		10	-This is why----------------------------history	-Systematic Reasoning -Objectivity	
		11	-From these studies-----------------following	-Appreciation (of knowledge)	
198		12-13 (Box)	(DINOSAURS)		
			-The most striking ----------------DINOSAURS	-do-	

			-Many of them---------------------------chickens	-do-	
			-It was the -----------------------eating dinosaur	-Appreciation (of knowledge)	
			-However, there---------------------extinction	-Open-mindedness	
			-The most striking-------------------extinction	-Quest for knowledge	
199		Fig.13.4	Figure 13.4	-Precision	
200	13.3		**-(What do the Comparative----------------------indicate ?)**		
200-201		21	-Not that--------------------------------ancestor ?	-Unity in diversity -Systematic Reasoning	-All vertebrates are derived from a common ancestor
201-202		22	-Do you--------------------------------mammals	-Curiosity -Quest for knowledge	-The curiosity is aroused to study the given figure
202		25	-Thus the diversity-----------------organisation	-Precision	
			-Does it not----------------------------ones ?	-Unity in diversity	-Common origin of all organisms
203		29	-What is the----------------------------organs ?	-Systematic Reasoning	
204	13.4		**-(What do the Embryos Suggest ?)**		
204		31 & Figure 13.11	-Note how strikingly-------------------------are	-Curiosity -Appreciation (of knowledge)	

			-Also note-------------------------------forms	-do-	
		32	-Does it show-----------------------------ancestor ?	-Systematic Reasoning	
		33	-Therefore, from-----------------------another.	-Precision	
		34	-**(Answer These)**		
			-Question No.2	-Systematic Reasoning	
	13.5		-**(Mode of Origin of Species)**		
		35	There was just--------------------scientific theory	-Objectivity	
			-The work of Charles Darwin-------------------------------this theory	-Appreciation (of knowledge)	
			-He made--------------------------EVOLUTION	-Perseverance	-Scientist's innumerable observations, evidence and tireless work for many years is emphasized.
206		36	-Through selective-----------------new species	-Systematic Reasoning	
			-You have also-----------------------conditions	-Unity in diversity	-Species of plants and animal differ considerably in their attributes
		37 38 39	-He observed-------------------different species	-Systematic Reasoning	
208		Fig. 13.14	-Figure 13.14. Some of the-----------islands	-Unity in diversity	

		42	-Examine a plant--------------------water loss	-Systematic Reasoning	
209		47(Box)	**-(ORIGIN OF LIFE)**		
			-Origin of life---------------------life began	-Open mindedness	-Still more work and evidence is required
			-On the basis-------------------chemical evolution	-Objectivity	
			-Origin of life-----------------------years ago	-Quest for knowledge	
		48	**-(Answer These)**		
			-Question No.1	-Systematic Reasoning	
			-Question No.2	-do-	
			-Question No.3	-do-	
210		49	**-(You Now Know)** -There are-----------now	-Precision	
		50	**-(Now Answer These)**		
			-Question No.2	-Systematic Reasoning	
			-Question No.4	-do-	

Chapter : Fourteen
Title : Conservation of Natural Resources

Page	Section	Para	Content	Value	Remarks
211		1	-But, as time------------------------------of living	-Appreciation (of knowledge)	
			-And to meet------------------------------ exhaustible	-Protection of Environment	-Concern for depletion of water resources
			-It has, therefore-------------------------- resources	-Protection of Environment	-Conservation of natural resources
		Fig. 14.1	-(**Fig.14.1**)	-Precision	-Brief and clear presentation in figure
	14.1		**-(Natural Resources)**		
212		4	**(Answer These)**		
			-Question No.1	-Systematic Reasoning	
			-Question No.2	-do-	
	14.2		**-(Renewable Resources)**		
		5	-This is how---------------------------renewed	-do-	
		Fig. 14.2	-(Fig 14.2)--------------- – The Nitrogen-------------------------------cycle	-Precision	-Brief and clear presentation in figure
213		6(box)	-Every form--------------------------------- energy	-Quest for knowledge	

		7	-Due to over-exploitation-----------------------------for ever	-Protection of Environment (Extinction of plants & animals)	-The result of over exploitation of forest resources by man lead to extinction of plants and animals
		8	-They all depend-------------------------around it	-Appreciation (Interdependence) -Systematic Reasoning	-Interdependence of different resources
		10 and Fig 14.3	-**(Activity 1)** -Trace Fig 14.3-----------------------the lesson (including fig.14.3,page 214)	-Quest for knowledge -Systematic Reasoning -Precision	
		11	-**(Answer These)** -Question No.1 -Question No.2	-Systematic Reasoning -do-	
214	**14.3**		-**(Limits of Renewable Resources)**		
		13	-In many areas-------------------------region	-Protection of Environment (concern for exhaustion) -Systematic Reasoning	-Misuse of resources is pointed out
215		Fig 14.4	-**(Fig. 14.4)**- The water cycle-------------	-Precision	

		14	-Over-grazing-----------------------------water	-Protection of Environment (misuse of resources)	
		15	-Thus the system---------------------exhaustible	-Systematic Reasoning	
215-216		17, 18	-If the same plants------------------fertilizers	-Systematic Reasoning	
217		19	**-(Activity 2)**		
			-Quickly note-------------------------------soil	-Honesty and Truthfulness	
			-Why is the--------------------------organism ?	-Systematic Reasoning	
		20	**-(Answer These)**		
			-Question No.2	-Systematic Reasoning	
	14.4		**-(Forest Resources)**		
		21	-Forests are--------------------------even today	-Appreciation (of knowledge)	
218		22	-The forest is---------------------------system	-Appreciation (of nature)	
			-Therefore, to protect----------------water	-Protection of Environment	-Emphasis on need to conserve the resources
		23	-To preserve forests-----------------completely	-Protection of Environment (Preservation)	-Emphasis on concern for protection/ preservation

		24-25	-In mild life------------ --------plants and animals	-Systematic Reasoning	
		26	-Certain living---------- ------------------man	-do-	
		27	-To conserve------------ ------------interference	-Protection of Environment	-Emphasis on protection of forests
			-With this purpose------ ---------------animals	-Appreciation (of knowledge)	
220		28 (Box)	**(WILD ANIMALS OF SIKKIM)**		
			-Snow----------pigeon	-Quest for knowledge	
		29	-Conservation---------- -----------------barren	-Systematic Reasoning	
		30	-**(Answer These)**		
			-Question No.1	-Systematic Reasoning	
			-Question No.2	-do-	
			-Question No.3	-do-	
	14.5		-**(Non-Renewable Sources)**		
		31	-Mineral resources------ ------------------iron	-Appreciation (of knowledge)	
			-Minerals were--------- -----------------rate	-do-	

			-Compare this-------------------------resources	-Protection of Environment (concern for depletion)	
		32	**-(Answer These)**		
			-Question No.1	-Systematic Reasoning	
221	**14.6**		**-(Conservation of Non-Renewable Resources)**		
		34	-The only way--------------------------longer	-Protection of Environment (Conservation)	-Using resources carefully and avoiding misuse.
		36	-The industry---------------------------resources	-Appreciation (of knowledge)	
		38	-We do not-----------------------------properties	-do-	
		39	-If we try-------------------------------------daily	-Sense of Responsibility	
		40	-This type of----------------------------------jobs	-Objectivity	
222		42	**-(Answer These)**		
			-Question No..3	-Systematic Reasoning	
	14.6		**-(Destruction of Natural Resources)**		

223		43	-For example,-------------------------resources	-Systematic Reasoning	
			-Thus pollution can------------------resources	-Precision	
		45	**-(Answer These)**		
			-Question No.2	-Systematic Reasoning	
		46	**-(Now You know)**		
			-Materials-----------resources	-Precision	

Chapter : Fifteen
Title : Alternative Sources of Energy

Page	Section	Para	Content	Value	Remarks
225	15.1		**-(Sources of Energy)**		
		9	-In our day-to-day---------------fuels.	-Appreciation (of knowledge)	
226		10	-Firewood was ---------------rural areas.	-Appreciation (of knowledge)	
		14	-Coke is a cleaner---------------energy.	-do-	
227		18	-Today most of-------------------------products	-do-	
228		23	-Electricity is a ---------------------------energy	-do-	
		25	**-(Answer These)**		
			-Question No.1	-Systematic Reasoning	
	15.2		**-(The Energy is Essential for our Living)**		
		26	-Table 15.1----------------------------development	-Precision	
229		27 and fig. 15.1	-It can be seen-----------------------------man	-Appreciation (of knowledge)	

231		37	-It is important-------------------------petroleum	-do-	
		38	-Coal gas is-----------------------------industries	-Appreciation (of knowledge)	
		39	-Petroleum is-----------------------------petroleum	-do-	
	15.3		**-(Alternative Sources of Energy)**		
		42	-Why are we------------------------concentrate it	-Systematic Reasoning	
		43	-A Solar cooker---------------------------principle	-Appreciation (of knowledge)	
232		44	-The solar cooker can-------------------biscuits	-do-	
			-The solar cooker reaches---------chapaties	-Objectivity	
		47	-It is, however,-----------------------------furnaces	-do-	
		49	-Bio-gas is an-----------------------------in India	-Appreciation (of knowledge)	
		50	-The slurry------------------------------for plants	-do-	
233		51	-The contrast-----------------------------is saved	-do-	

		54	-The water-----------------------------------energy	-do-	
		55	-In India-----------------------------flowing water	-do-	
234		60	-In India-----------------------------------Narora	-National Pride	
		62	-Non-renewable-----------------------conserve them	-Protection of Environment (Conservation)	-Emphasis on development of simple habits to conserve energy resources at home are given
			-We can start--------------------------------energy	-Appreciation (of knowledge)	
		63	-Another way---------------------------maintained	-do-	
		64	**-(Answer These)**		
			-Question No.2	-Systematic Reasoning	
			-Question No.3	-do-	
234-235		65	**-(Now You Know)**		
			-We use--------conserved	-Precision	
235		66	**-(Now Answer These)**		
			-Question No.2	-Systematic Reasoning	
			-Question No.5	-do-	

Chapter : Sixteen
Title : How Leaves are Designed ?

Page	Section	Para	Content	Value	Remark
236		1	-The living things--------------------of forms	-Appreciation (of nature)	
			-Getting to know-------------------every where	-do-	
		2	-This function they--------------------in water	-do-	
			-Most land plants-----------------complicated	-do-	
			-Of all these--------------------are leaves	-do-	
			-Leaving that aside------------environment	-do-	
236 and 238		3	-Go around---------------------------exhibit	-do-	
238		4	-As much as-----------------------difficulties	-Objectivity	
			-The large almost--------------------look at	-Appreciation (of nature)	
			-Why is that ?------------------------trouble	-Systematic Reasoning	
		5	-The water hyacinth--------------------distance	-Appreciation (of nature)	

			-Once again-------------------------achieve this	-Appreciation (of knowledge)	
			-The base of------------------------roll down	-Systematic Reasoning	
239		6	-These underwater-----------------------them	-do-	
			-These fine finger like-----------------them	-Appreciation (of nature)	
		8	-India has --------------------------------wild	-National Pride	
			-The taller the-----------------------------wind	-Precision	
			-Therefore, the-----------------------through	-Appreciation (of knowledge)	
241		9	-However, a plant-------------------water	-Objectivity	
			-Therefore, this------------------------forests	-Appreciation (of nature)	
		10	-Its bunches of-----------------------this plant	-do-	
		11	-In extreme-----------------------------at all	-do-	